



Rocky Flats Environmental Technology Site

**Reconnaissance Level Characterization
Package for Group C Facilities**

February 2000

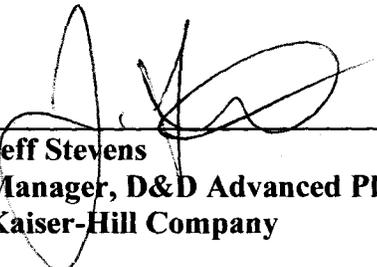
Revision 0



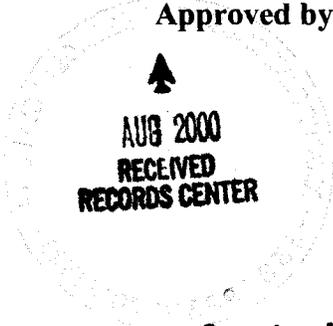
Marla Broussard 2-24-00
RMRS Responsible Manager Date



Mark Brooks 2-24-2000
RMRS Quality Assurance Date

Approved by: 

Jeff Stevens 2-25-00
Manager, D&D Advanced Planning Date
Kaiser-Hill Company



1/604

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1.0 INTRODUCTION

This Characterization Package is designed to describe the necessary surveys and sampling for Reconnaissance Level Characterization (RLC) and Pre-Demolition Survey (PDS) in preparation for release and re-use of RFETS Group B Facility: B575. The RLC and PDS strategies are based upon the draft *Reconnaissance Level Characterization Plan* (RLCP) and the *Pre-Demolition Survey Plan* (PDSP), respectively, including the Data Quality Objectives (DQOs) presented herein. The DQOs used to implement this strategy are presented below. The DQO process was used to evaluate existing information and data and to determine additional characterization requirements needed to define building hazards (radiological, chemical and safety) per Attachment 9 of RFCA and to initially identify anticipated waste streams. All quality assurance requirements presented in MAN-077-DDCP, *Decontamination and Decommissioning Characterization Protocol* (DDCP) will be followed.

Existing data on radiological and non-radiological hazards associated with this facility are insufficient to address the applicable DQO decision rules. In most cases, radiological surveys were carried out many years ago and are not retrievable. Likewise, no data exist for non-radiological hazards such as asbestos and PCB-containing ballasts in fluorescent light fixtures.

Radiological Characterization

Based upon historical and process knowledge, the radiological contaminants of concern for the purposes of surveys and sampling were determined to be uranium, plutonium and americium. Radiological surveys for fixed and removable contamination will be conducted on internal and external walls, floor, ceilings and roofs as directed by the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Radiological measurements and samples will be collected per PRO-476-RSP-16.02, *Radiological Surveys of Surfaces and Structures* and PRO-477-RSP-16.03, *Radiological Samples of Building Media*.

Non-Radiological Characterization

The non-radiological contaminants of concern for the purposes of sampling were determined to be PCBs (contained within Fluorescent light fixtures) and asbestos. Asbestos sampling and analyses is as per PRO-563-ACPR, *Asbestos Characterization Procedure*.

The characterization requirements are summarized in Table 1.

Table 1: SUMMARY OF CHARACTERIZATION REQUIREMENTS

For all required surveys and sampling, historical and RLC data will be provided as attachments to the Reconnaissance Level Characterization Report (RLCR).		
Contaminant	Sample/ Survey Amount & Type	Comments
Radiological contaminants (Pu, U, and Am)	A total of 380 total surface activity measurements (76 per facility except B331A and B987, which have only 38) plus biased scans	Total surface activity measurements include fixed and removable contamination surveys for alpha and beta. Biased scans are on floors and exterior surfaces in seams, cracks, corners, and other locations where contamination is expected to accumulate. No less than 10% of the total area will be scanned.
RCRA Constituents	None required.	According to historical data and process knowledge, no RCRA-regulated chemicals were used or stored in any of the facilities (<i>D&D Facility Characterization Interview Checklist and Attached Facility Checklist and HRR Manager's Report</i>). Therefore, sampling for chemical contaminants is unnecessary and will not be conducted.
Lead (Pb) in paint	None required.	Environmental Waste Compliance Guidance #27, <i>Lead-based Paint (LBP) and Lead-based paint Debris Disposal</i> , has directed that LBP debris generated outside of currently identified HCA's shall be managed as non-hazardous waste derived from LBP is not a requirement for disposal. Additionally, lead characterization is not required for release of facilities to commerce, as long as it is disclosed to the buyer that the trailer may contain lead-based paint. Therefore, analysis of the lead content of paint on the facilities and buildings is unnecessary and will not be conducted.
Beryllium	None required.	There is no record of beryllium operations or storage being carried out in any of the facilities (<i>D&D Facility Characterization Interview Checklist and Attached Facility Checklist and HRR Manager's Report, and CBDPP List of Known Beryllium Areas</i>).

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<p>Poly-chlorinated biphenyls (PCBs)</p>	<p>Inspection of fluorescent light fixtures for PCB ballasts</p>	<p>Fluorescent light fixtures in each facility are likely to contain PCB-containing ballasts. For facilities that are to be re-used or released to commerce, PBC ballasts must be inspected for leakage prior to release to commerce, and if leaking, must be removed.</p> <p>Environmental Waste Compliance Guidance #25, <i>Management of Polychlorinated Biphenyls (PCBs) in Paint and Other Bulk Product Waste During Facility Disposition</i>, has directed that applied dried paints, varnishes, waxes, or other similar coatings or sealants are acceptable for disposal (with notification) in a non-hazardous solid waste landfill as PCB Bulk Product Waste under 40 CFR 761.3 and 40 CFR 761.62 paragraph (b) and therefore need not be sampled as long as restrictions outlined in 40 CFR 761.62 regarding their disposal are met. Therefore, analysis of PCBs in paint from the interior and exterior surfaces of the facilities is unnecessary and will not be conducted.</p>
<p>Asbestos</p>	<p>Inspection for friable and non-friable asbestos.</p> <p>Sampling at direction of CDPHE-certified asbestos inspector.</p>	<p>For facilities that are to be re-used or released to commerce, inspection must be conducted for friable asbestos only.</p>

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2.0 DATA QUALITY OBJECTIVES

This section defines the DQOs for RLC and PDS in preparation for release and re-use of the RFETS Group C facilities.

2.1 The Problem

The nature and extent of radiological, chemical, and safety hazards for each facility in Group C are not known with sufficient confidence for unrestricted release.

2.2 The Decision

Have unrestricted release standards been met relative to potential chemical and radiological hazards?

2.3 Inputs to the Decision

The inputs to the decision include the planned RLC and PDS survey and sampling data, historical information generated from previous characterization activities, and the applicable unrestricted release criteria. Specifically, inputs to the decision rule include:

- Radiological survey/scan measurements of the facilities;
- Asbestos inspection and sampling results;
- Inspection of fluorescent light fixtures for PCB-containing ballasts;
- Quality assurance aspects of the data, including precision, accuracy, representativeness, completeness, and comparability (i.e., the PARCC parameters);
- Unrestricted release criteria (1-P73-HSP-18.10, Appendix 1);
- 40 CFR 761 (PCB regulations)
- 40 CFR 763 and 5 CCR 1001-10 (asbestos regulations).

Radiological instrumentation planned for the project is controlled by K-H through contractual requirements with onsite and offsite (radiochemistry) vendors. All instrument sensitivities are adequate for producing results comparable to unrestricted release action levels and compliance with DOT requirements.

2.4 Decision Boundaries

Three-dimensional boundaries for defining the levels and extent of radioactive contamination are restricted to the interior and exterior surfaces, and do not include the underlying soil. There are no temporal boundaries relative to technical data quality; time constraints depend only on the project schedule.

2.5 Decision Rules

The following are decision rules to be used during PDS:

- If all radiological survey/scan measurements are below the surface contamination thresholds provided in DOE Order 5400.5 (Radiation Protection of the Public and Environment) and the RFETS Radiological Control Manual, the related area or volume of material is considered sanitary waste and may be free-released.

- If any radiological survey/scan measurement exceeds the surface contamination thresholds provided in DOE Order 5400.5, the related area or volume of material must be remediated or dispositioned as radiological or mixed waste.
- PCB-containing ballasts *which are leaking* must be identified and removed prior to release as directed in PRO-673-EWQA-1, *RFETS Polychlorinated Biphenyls Management Plan*, Environmental Compliance Guidance No. 22, *Management of Fluorescent Light Ballasts*, and 40 CFR 761.
- For asbestos, in accordance with 40 CFR 763 and 5 CCR 1001-10, if any one sample of a sample set representing a homogeneous medium results in a positive detection (i.e., > 1% by volume), then material is considered asbestos-containing material (ACM); otherwise the material is considered non-ACM.

2.6. Tolerable Limits on Decision Errors

Statistically based radiological surveying and sampling will be conducted per the guidance in Section 5.5 of MARSSIM and the PDSP. The location of radiological survey/sampling points will be delineated per the guidance provided in Section 5.5 of MARSSIM. Radiological field measurement methods and instrumentation will be delineated per the guidance in Section 6 of MARSSIM. Radiological sampling and preparation for laboratory measurements will be delineated per the guidance in Section 7 of MARSSIM.

2.7. Optimization of Plan Design

The number of survey points was determined as prescribed by MARSSIM §5.5.2.3. A conservative estimate of relative shift (Δ/σ) as (1), coupled with a 5% acceptable error for alpha and beta, respectively, resulted in 28 random measurement locations per survey unit.

No statistical basis is necessary for potential non-radioactive hazards, as process knowledge associated with the facilities indicates no previous chemical processing, and visual inspections are biased toward the most likely areas or portions of the facilities to yield PCBs (ballasts) or asbestos.

3.0 CHARACTERIZATION INSTRUCTION FOR RADIOLOGICAL SURVEYS

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INTEROFFICE CORRESPONDENCE

DATE: February 8, 2000
TO: FILE
FROM:  R. S. Roberts, Radiological Engineering Support Services, Bldg. T130B, X4869
SUBJECT: SCAN SURVEY REQUIREMENTS FOR THE PRE-DEMOLITION SURVEY FOR
THE GROUP B/C FACILITIES- RSR-001-00

The purpose of this correspondence is to document the methodology to be used to perform radiological scan surveys for the Pre-Demolition Survey at the Group B/C facilities.

To perform beta scans for the Group B/C facilities, the following methodology will be used.

1. The NE Electra with DP6 Probe will be used.
2. The probe will be moved at a speed of 4 inches/second. This corresponds to a scanning MDC of 2525 dpm/100 cm² (See Rad Engineering Calculation No. 00-RS-0001, "Beta Scan MDC Calculation For NE Electra with DP6 Probe").
3. If elevated activity is found during scanning, perform a 1-minute PAT at that location.
4. Record PAT results. If PAT results are ≥ 3750 dpm/100 cm², contact radiological engineering.
5. Continue scanning.

To perform alpha scan surveys for the Group B/C facilities, the attached methodology outlined in Attachment A will be used. This alpha scan methodology is consistent with the methodology used to perform Final Status Surveys at Building 779. If a 90-second PAT result is ≥ 75 dpm/100 cm², contact Radiological Engineering Support Services.

Each survey unit within the Group B/C facilities will have 10% of the surface area scanned for both alpha and beta contamination. Areas with the highest potential for contamination will be scanned.

CONCURRENCE



Bates Estabrooks, Manager
Radiological Engineering Support Services

JWP:alk

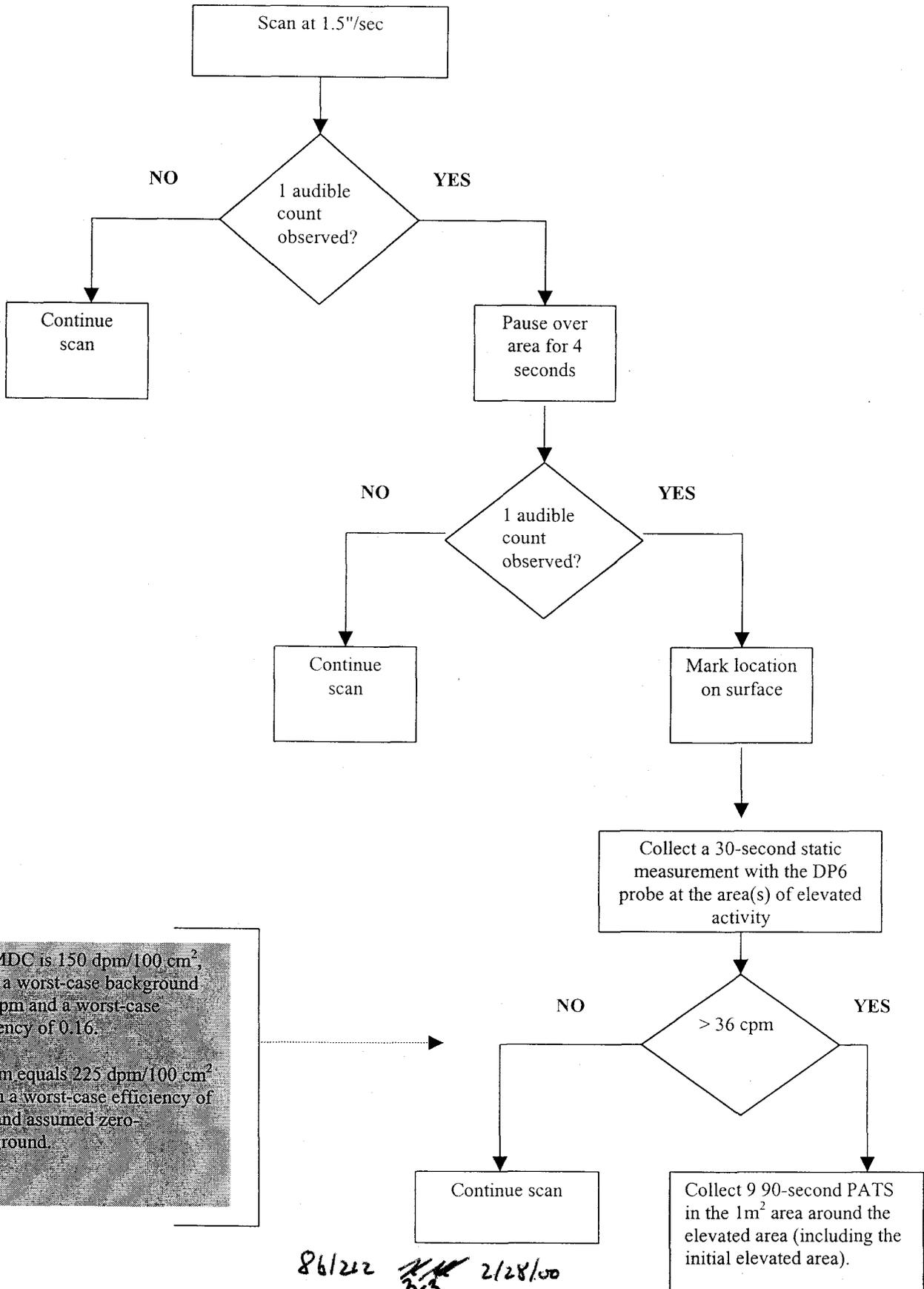
Attachment
As Stated

cc:
H. B. Estabrooks
E. D. Lesses
R. P. Worster

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3-2

9

Attachment A Scan Method with DP6 (Alpha)



- The MDC is 150 dpm/100 cm², given a worst-case background of 8 cpm and a worst-case efficiency of 0.16.
- 36 cpm equals 225 dpm/100 cm² (given a worst-case efficiency of 0.16 and assumed zero-background).

86/242 ~~2/28/00~~ 2/28/00



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INTEROFFICE CORRESPONDENCE

DATE: February 9, 2000
TO: FILE
FROM: R.S. Roberts, Radiological Engineering, Bldg. T130B, X4869
SUBJECT: RADIOLOGICAL SURVEY FORMS FOR THE PRE-DEMOLITION SURVEY
FOR THE GROUP B/C FACILITIES- RSR-002-00

The purpose of this correspondence is to delineate the radiological survey forms that will be used to document total, removable and scan surveys for the Pre-Demolition Survey at the Group B/C facilities.

The following attached survey forms will be used to document the total, removable and scan surveys for the Pre-Demolition Survey at the Group B/C facilities.

1. Instrument Data Sheet
2. Survey Signature Sheet
3. Total Surface Activity Sheet
4. Removable Contamination Data Sheet
5. Final Survey NE Electra Scan & Investigation Survey Form
6. Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)
7. Final Survey NE Electra Scan & Investigation Survey Map

These attached survey forms replace RSFORMS-16.02-1, "Total Surface Activity Survey Data Form," RSFORMS-16.02-2, "Removable Surface Activity Data Survey Form," and RSFORMS-16.02-3, "Surface Scanning Data Sheet." The attached forms were used during the Final Status Survey at Building 779, and their use will streamline the process by which radiological surveys are documented. The following changes to the forms are noted.

- The use of a "Probe Correction Factor" and an "Efficiency" is redundant so the use of the "Probe Correction Factor" was discontinued.
- A "Sample Location" with an associated location map is being used instead of both a "Sample/Swipe Number" and "Location/Description" designator. These are equivalent.
- The date of the survey is being recorded instead of both the date and time. This is sufficient for documentation.
- The "Probe Number" has been deleted for swipe survey instruments since no probe is associated with these instruments.

CONCURRENCE

Bates Estabrooks, Radiological Engineering Support Services Manager

attachments

cc: Ron Worster Bates Estabrooks

8c/212 2/25/00
3-4

Survey Area:	Survey Unit:	Building:
Survey Unit Description		

INSTRUMENT DATA SHEET
Removable Contamination Survey Instrument Data

Manufacturer				
Model				
Inst. ID #	1	2	3	4
Serial #				
Cal. Due Date				
Analysis Date				
Instrument Bkgd				
Instrument Eff.				
Instrument MDA				

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.	N.E. Tech.	N.E. Tech.		
Model	Electra	Electra	Electra		
Inst. ID #	5	6	7	8	9
Serial # / Probe #	/	/	/		
Cal. Due Date					
Survey Date					
Alpha Bkgd / Beta Bkgd	/	/	/		
Alpha Efficiency / Beta Efficiency	/	/	/		
Instrument MDA Alpha / Beta	/	/	/		

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8d/22 ~~MA~~ 2/28/00

Survey Area:	Survey Unit:	Building:
Survey Unit Description		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

RCT ID # 1				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 2				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 3				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 4				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 5				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 6				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 7				
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT ID # 8				
	RCT Printed Name	Employee #	RCT Signature	Date
RCT ID # 9				
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

RCT Foreman Printed Name	Employee #	RCT Foreman Signature	Date

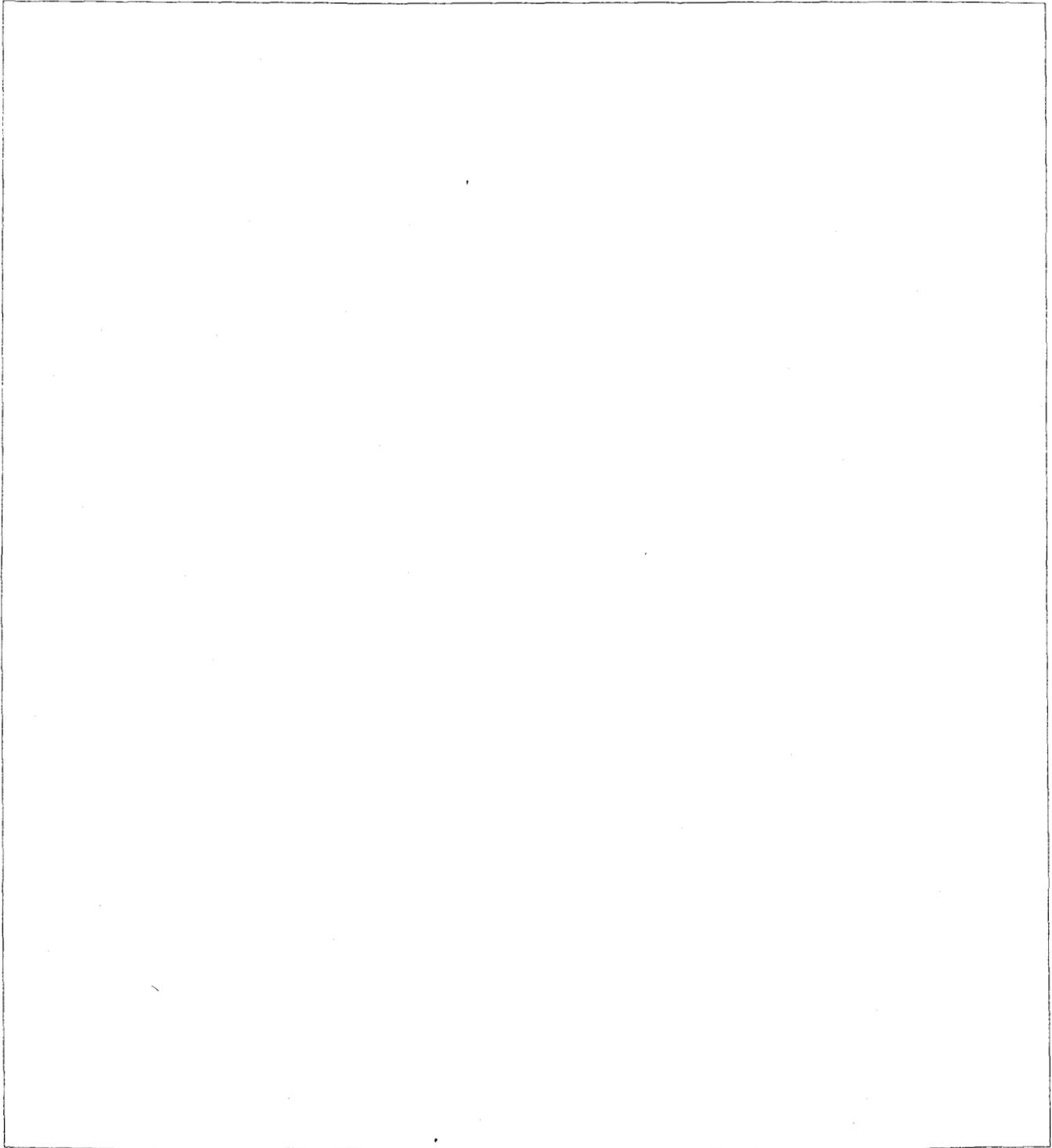
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8e/212 ~~AAA~~ 2/28/00

Final Survey NE Electra Scan & Investigation Survey Map

SU: _____	Survey Date: _____	Survey Number: _____
Survey Unit Description: _____		
RCT Initials/Date: _____	RCT Initials/Date: _____	RCT Initials/Date: _____

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



89/212 ~~MAN~~ 2/28/00
2-11

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INTEROFFICE CORRESPONDENCE

DATE: March 9, 2000
 TO: FILE
 FROM: 
 R.S. Roberts, Radiological Engineering, Bldg. T130B, X4869
 SUBJECT: ROOF SURVEY/SAMPLING REQUIREMENTS FOR THE GROUP B/C
 FACILITY CHARACTERIZATION – RSR-003-00

The purpose of this correspondence is to document the methodology to be used to perform roof survey/sampling at the Group B/C facilities. Roof sampling is required due to consistently high total alpha readings on the roofs above the DCGL_w (100 dpm/100 cm²). There is no associated removable alpha activity above the release limits in DOE Order 5400.5. The total and removable beta activities are also below the release limits in DOE Order 5400.5.

Historical and process knowledge on the Group B/C facilities gives no indication that DOE added radioactive material should be present on the exterior of the trailers. Therefore, these elevated readings are expected to be from radon daughter products. This is anticipated since elevated roof readings at Rocky Flats have been a continuing occurrence with no corroborating evidence that the elevated readings are from DOE added radioactive material.

The following methodology will be followed to survey/sample the exterior of the Group B/C facilities.

1. The 10% exterior scans will be taken on the walls of the exterior of the trailer.
2. At one elevated location on the roof, it will be verified that the average total alpha contamination is above the 100 dpm/100 cm² average release limit. This will be performed by taking 9 total alpha surveys at each location. The surveys will be performed in a 3 X 3 matrix within a one square meter area. The 9 survey results will be averaged and reported. An alpha scan of the one square meter area will also be performed to document the range of alpha activities in the one square meter.
3. At the location where the 9 survey points was taken and at the next highest survey point, roof samples will be taken.

A roof sampling and analysis methodology will be developed and approved for use within the applicable IWCP (SWP-RFCSS-0002-00).

CONCURRENCE



3/9/00

Bates Estabrooks, Radiological Engineering Support Services Manager

cc: Marla Broussard
Ron Worster

Bates Estabrooks

Steve Luker

Eric McKamey

PK of 212
3/12

 3/15/00



KAISER • HILL

INTEROFFICE MEMORANDUM

DATE: June 7, 2000

TO: File

FROM: Eric D. McKamey, D & D Advanced Planning, Building 116, X3209

SUBJECT: ROOF SURVEY/SAMPLING REQUIREMENTS FOR THE GROUP B/C FACILITY CHARACTERIZATION – RSR-003-00, REVISED – EDM-003-00

The purpose of this correspondence is to provide clarification to the methodology used to perform roof survey/sampling for the Group B/C facilities. The Interoffice Correspondence entitled ROOF SURVEY/SAMPLING REQUIREMENTS FOR THE GROUP B/C FACILITY CHARACTERIZATION – RSR-003-00 was written and signed (concurrence) on March 9, 2000. A project meeting was held on March 15, 2000 to discuss the correspondence along with other project matters and set plans for implementation.

In order to ensure worker safety and meet applicable requirements, the following revised methodology was agreed upon by the project team at the above mentioned meeting to survey/sample the exterior of the Group B/C facilities.

1. Alpha scans of the one square meter 9 point investigation area were not to be performed. It was determined that the 9 point investigation values would suffice in documenting the range of alpha activities. (Item #2 on referenced correspondence.)
2. Sample locations were chosen at elevated locations that were safely accessible using a ladder. These locations were at/near the roof edge and may/or may not have included the location where the 9 point investigation was performed or at the next highest survey point. The TSA results at the sample locations were representative of the TSA results determined in the survey design. (Item #3 on referenced correspondence.)

CONCURRENCE

 6/7/00
 Bates Estabrooks Date
 Acting Manager
 Radiological Engineering

pjh

cc:
 Marla Broussard
 Steve Luker

Rick Roberts
 Ron Worster



KAISER • HILL

INTEROFFICE MEMORANDUM

DATE: August 2, 2000
TO: File
FROM: Eric D. McKamey, D & D Advanced Planning, Building 116, X3209
SUBJECT: DATA QUALITY ANALYSIS (DQA) OF GROUPS B AND C SIGNATURE/INITIAL CLARIFICATION- EDM-007-00

This correspondence is provided to clarify the signature/initial requirements of the DQA performed for Groups B and C.

PRO-478-RSP-16.04, Radiological Survey/Sample Data Analysis, Appendix A provides a DQA Checklist to complete data analysis of Pre-Demolition Survey (PDS) data. The checklist provides a block for initials/date of the Radiological Engineer performing the step but does not require a signature. The information provided below identifies by name, signature and initials the individuals responsible for completing the DQA Checklist for Groups B and C.

DQA:

Eric D. McKamey Name Signature Initials EDM
Peer Review:
D. A. Barnes Name Signature Initials

CONCURRENCE

Joe Mahaffey Manager, Radiological Engineering Date 8-2-00

edm

“Concentrate: Safe Behavior Equals Safe Performance”



KAISER • HILL

INTEROFFICE MEMORANDUM

DATE: August 2, 2000

TO: File

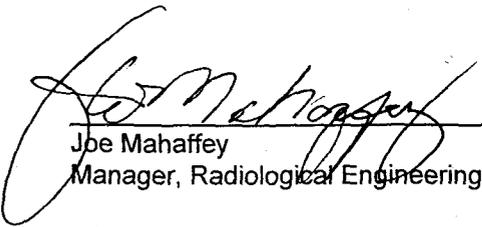
FROM: Eric D. McKamey, ^{EDM} D & D Advanced Planning, Building 116, X3209

SUBJECT: T-883C (Interior and Exterior) Survey Packages Status-- EDM-008-00

This correspondence is provided to clarify the status of the T-883C (Interior and Exterior) Survey Packages.

T-883C was originally part of the Group B Characterization Package. Reconnaissance Level Characterization (RLC) surveys were performed to Pre-Demolition Survey (PDS) requirements to release the trailer for re-sale. T-883C was removed from the Group B Characterization Package after the completion of the surveys and reassigned/relocated to support B771. The T-883C Survey Packages are provided for historical information only and will not be used to release the trailer for re-sale.

CONCURRENCE



Joe Mahaffey
 Manager, Radiological Engineering

8-2-00
 Date

edm

“Concentrate: Safe Behavior Equals Safe Performance”

22

3-13b

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T771D	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS	[Redacted]	<i>[Signature]</i>	2/3/00
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE	N/A	N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[Redacted]	<i>[Signature]</i>	2/2/00
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS ^{EMP 7/11/00}	[Redacted]	<i>[Signature]</i>	8/14/00
RESS Radiological Engineer Printed Name	Employee #	RESS Radiological Engineer Signature	Date
NOT APPLICABLE	N/A	N/A	N/A
REFS Manager Printed Name	Employee #	REFS Manager Signature	Date
H. B. ESTABROOKS ^{8/14/00}	[Redacted]	<i>[Signature]</i>	8-14-00
RESS Manager Printed Name	Employee #	RESS Manager Signature	Date

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T771D		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior		Area (m ²): 222	
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T771D
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	INTERIOR FLOORS/WALLS/CEILINGS: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6
	<u>QUALITY ASSURANCE SURVEYS</u> INTERIOR FLOORS/WALLS/CEILINGS: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T771D
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning <i>Change #2 KRM 7-11-00</i>	<p>INTERIOR FLOORS: Biased surface scans will be performed on the interior floors in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring.</p> <p>^{less} No more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u> INTERIOR FLOORS: 5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T771D		
Survey Area: Not Applicable	Survey Unit: Interior		
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.			
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS			2/3/00
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS			2/3/00
RESS RE Printed Name		RESS RE Signature	Date

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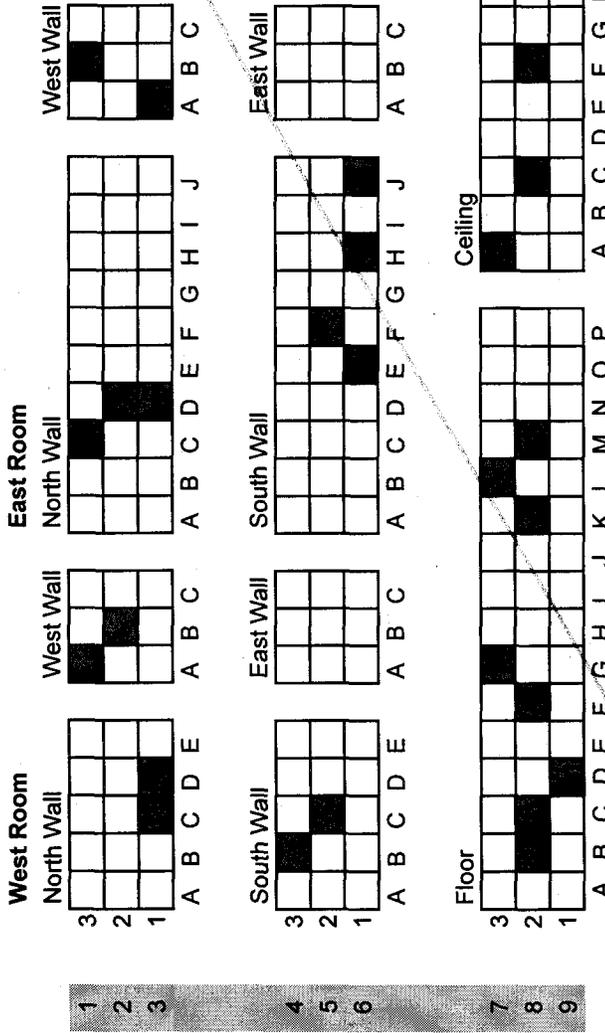
33

SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Floor Area (m²): 48	Total Area (m²): 222
SEE ATTACHED SURVEY MAP	

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T771D Interior



X	Y	X	Y	X	Y
1	14	3	11	22	3
2	18	7	12	13	1
3	14	2	13	18	6
4	23	8	14	29	7
5	20	8	15	3	8
6	7	1	16	30	8
7	15	6	17	13	8
8	20	6	18	2	8
9	3	3	19	16	5
10	6	8	20	8	2
				21	12
				22	4
				23	2
				24	3
				25	11
				26	7
				27	23
				28	4
				29	3
				30	8
				31	32
				32	33

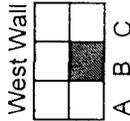
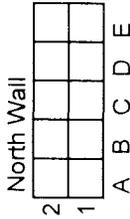
□ = one square meter
 ■ = direct & swiipe

X-Coordinate	Y-Coordinate
19	6

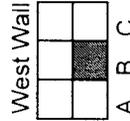
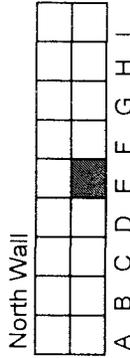
Total Surface Area = 222 m²
 10% Scan Surface Area = 22 m²

T771D Interior

West Room



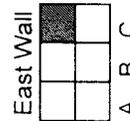
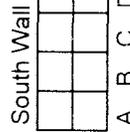
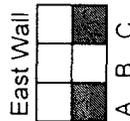
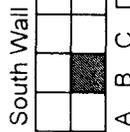
East Room



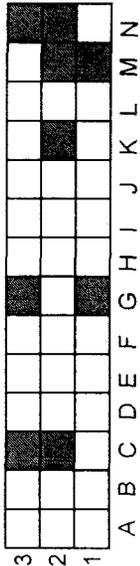
1
2

3
4

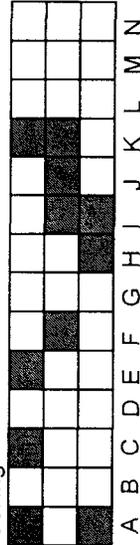
5
6
7



Floor



Ceiling



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29

X-Coordinate	Y-Coordinate
19	4

□ = one square meter
 ■ = direct & swipe

1	8	2	11	9	4	21	23	7
2	13	7	12	26	5	22	20	5
3	22	2	13	3	5	23	19	4
4	16	5	14	15	2	24	2	4
5	14	6	15	7	7	25	13	6
6	11	6	16	25	6	26	7	5
7	21	6	17	24	6	27	16	7
8	18	5	18	3	6	28	24	7
9	7	4	19	14	5			
10	26	6	20	23	3			

Total Surface Area = 164 m²

10% Scan Surface Area = 16.4 m²

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2/28/00

APPENDIX A

Page 1 of 1

DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KDM / 6/1/00	
7.1[1]	DQOs implemented as prescribed	KDM / 6/1/00	
7.1[2]	All required supporting documents present	KDM / 6/1/00	
7.1[3]	Outliers / anomalies addressed	KDM / 6/1/00	
7.2	Data Validation	KDM / 6/1/00	
7.2.1	Survey/Sample Precision	KDM / 6/1/00	
7.2.2	Survey Accuracy	KDM / 6/1/00	See spreadsheets
	Sample Accuracy	KDM / 6/1/00	
7.2.3	Data Representative of survey unit	KDM / 6/1/00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM / 6/1/00	100%
7.2.5	Data Comparable to related units	KDM / 6/1/00	yes, Group B
7.3	DQA complete	KDM / 6/1/00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	NA	
7.3[4]	Mean > DCGL _w	NA	
7.3[5]	Any measurement > maximum DCGL	NA	
7.4	Evaluation	NA	
7.4[1][D]	New survey package (if req'd)	NA	
7.4[1][E]	Radiological improvement report (if req'd)	NA	
7.4[2]	Verify documentation complete	NA	
8.0	Peer review	KDM / 6/13/00	NONE
	Package submitted to project management	KDM / 8-14-00	
9.1	Records to Records Center (copy to project files)	KDM / 8-27-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Interior
Building: T771D
Survey Unit Description: Walls, floors and ceiling of T771D

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by:

S. A. My 6/1/00

Removable Activity
(dpm/100 cm²) Alpha

-1.5
-1.8
3.0
-1.8
1.5
-0.3
-1.5
-1.8
0
-0.3
0.0
-0.3
-1.5
-0.3
0.0
-1.8
0
-0.3
-1.5
2.7
-1.5
-0.3

Survey Area - N/A
Survey Unit - Interior
Building - T771D
Survey Unit Description - Walls, ceiling and floor of Trailer T771D
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean -0.4 dpm/100 cm²
Std Dev 1.3 dpm/100 cm²

No measurement exceeds the DCGL_w

**Removable Activity
(dpm/100 cm²) Beta**

8.4
14.8
6.4
12.8
-41.6
32.8
-5.6
0.8
16.4
14.8
-13.6
16.8
-17.6
2.8
6.4
-7.2
14.4
24.8
-13.6
40.8
2.4
8.8
12.4
-23.2
-13.6
46.8
10.4
-9.2

Survey Area - N/A
Survey Unit - Interior
Building - T771D
Survey Unit Description - Walls, ceiling and floor of Trailer T771D
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean 5.3 dpm/100 cm²
Std Dev 19.2 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

-3.4
-9.8
-25.9
-16.6
0.0
-9.8
12.7
-9.8
-9.8
-15.8
-19.1
3.4
0.0
-9.6
12.4
9.6
-6.7
15.8
0.0
0.0
0.0
0.0
2.7
-5.8
3.1
0.0
-12.1
-4.5
8.9

Survey Area - N/A
Survey Unit - Interior
Building - T771D
Survey Unit Description - Walls, ceiling and floor of Trailer T771D
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean -3.2 dpm/100 cm²
Std Dev 10.1 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
E-1N	2.7	13.2	-10.5	7.95	-132.0755
B-1W (er)	3.1	16.1	-13.0	9.6	-135.4167
K-3C	0.0	2.9	-2.9	1.45	-200
B-1W (wr)	-12.1	6.8	-18.9	-2.65	713.2075
A-3C	-19.1	-16.1	-3.0	-17.6	17.04545

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/10.1$
 $\Delta/\sigma_s = 4.95$ (default 3.0)
 Sign p = 0.998650
 N = 10.88
 $10.88 * 1.2 = 13.05$
 N = 14

**Total Surface Activity
(dpm/100 cm²) Beta**

47
-44
57
-61
91
108
178
44
-27
-56
202
63
171
91
-17
35
73
119
-21
35
-59
-280
-201
-257
-214
-152
-201
-171

Survey Area - N/A
Survey Unit - Interior
Building - T771D
Survey Unit Description - Walls, ceiling and floor of Trailer T771D
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean -16.0 dpm/100 cm²
Std Dev 135.2 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
E-1N	-280	-34	-246	-157	156.6879
B-1W (er)	-257	94	-351	-81.5	430.6748
K-3C	35	88	-53	61.5	-86.17886
B-1W (wr)	-152	54	-206	-49	420.4082
A-3C	202	256	-54	229	-23.58079

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/135.2$
 $\Delta/\sigma_s = 18.49$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

Survey Area: NA	Survey Unit: INTERIOR	Building: T771D
Survey Unit Description WALLS, FLOOR, CEILING		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

[REDACTED]	A. PARKER	[REDACTED]		3-11-00
	RCT Printed Name		RCT Signature	Date
[REDACTED]	R. KELLEY	[REDACTED]		3-11-00
	RCT Printed Name		RCT Signature	Date
[REDACTED]	M. LAWSON	[REDACTED]		3-11-00
	RCT Printed Name		RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

[REDACTED]	R. KELLEY	[REDACTED]		3-11-00
	RCT Printed Name		RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date
[REDACTED]				
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Ron Webster	[REDACTED]		3/13/00
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: NA	Survey Unit: INTERIOR	Building: T771D
Survey Unit Description FLOOR, WALLS, CEILING		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	Eberline	Eberline	Eberline		
Model	SACH	BC4	SACH	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	1170	928	1171	868		
Cal. Due Date	6-30-00	3-27-00	7-11-00	7-12-00		
Analysis Date	3-11-00	3-11-00	3-11-00	3-11-00		
Instrument Bkg cpm 10-min count time	0.5	40.9	0.6	36.3		
Instrument Eff (%)	33	25	33	25		
Instrument MDA 2-min count time dpm	9.6	70.6	10.1	66.8		

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.					
Model	Electra		Electra		Electra					
Inst. ID #	7		8		9		10	11	12	
Serial # / Probe #	2376	1921	1395	1368	2378	1956				
Cal. Due Date	8-23-00		7-19-00		5-3-00					
Survey Date	3-11-00		3-11-00		3-11-00					
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	4.7	499	3.3	407	2.7 3.7 3/11/00	375			
Alpha Eff (%)	Beta Eff (%)	20.46	29.70	20.89	28.68	22.35	30.36			
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	49.1	291.8	41.7	273.5	36.0	248.3			

45

2376/421 2.7/407
 20.46 8.23.00
 29.7

See Locations:

T771D Interior

West Room

North Wall					
	A	B	C	D	E
2					
1					

West Wall					
	A	B	C		

North Wall									
	A	B	C	D	E	F	G	H	I

West Wall					
	A	B	C		

West Wall
A B C

South Wall					
	A	B	C	D	E
2					
1					

East Wall					
	A	B	C		

South Wall									
	A	B	C	D	E	F	G	H	I

East Wall					
	A	B	C		

East Wall
A B C

Floor

3														
2														
1														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N

Ceiling

	A	B	C	D	E	F	G	H	I	J	K	L	M	N

1 2 3 4 5 6 7

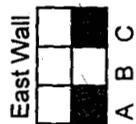
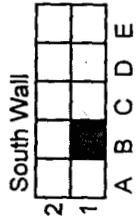
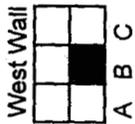
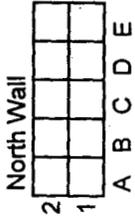
Handwritten signature and date: 3/13/00



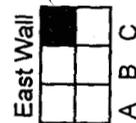
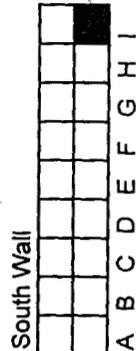
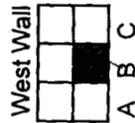
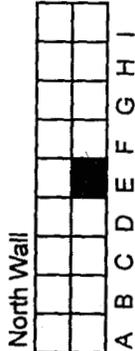
Handwritten signature and date: 3/13/02

T771D Interior

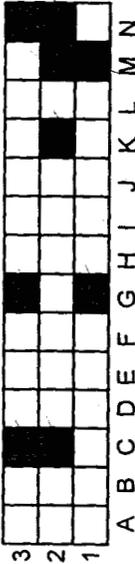
West Room



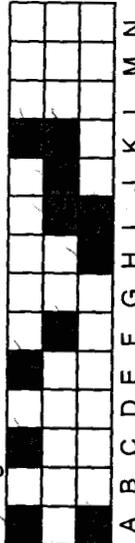
East Room



Floor



Ceiling



- 1
- 2
- 3
- 4
- 5
- 6
- 7

X-Coordinate	Y-Coordinate
19	4

= one square meter

= direct & swipe

1	8	2	11	9	4	21	23	7	X	Y
2	13	7	12	26	5	22	20	5		
3	22	2	13	3	5	23	19	4		
4	16	5	14	15	2	24	2	4		
5	14	6	15	7	7	25	13	6		
6	11	6	16	25	6	26	7	5		
7	21	6	17	24	6	27	16	7		
8	18	5	18	3	6	28	24	7		
9	7	4	19	14	5					
10	26	6	20	23	3					

Total Surface Area = 164 m²

10% Scan Surface Area = 16.4 m²

*Handwritten: 5 of 7
3-40*

Handwritten: 48

Survey Area: NA	Survey Unit: INTERIOR	Building: T771D
Survey Unit Description FLOOR, WALLS, CEILING		

Total Surface Activity Data Sheet

MAIN

EAST R.

WEST R.

ER

WR

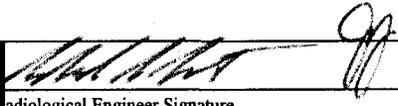
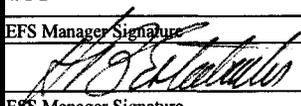
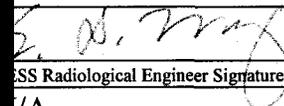
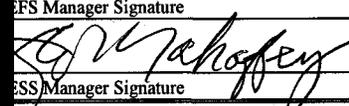
Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm2)	
		α	β	α	β	α	β	α	β	α	β	α	β
C-2F		7	7	90	90	4.7	499	4.0	513	-0.7	14	-3.4	47
C-3F		7	7	90	90	2.7	453	0.7	440	-2.0	-13	-9.8	-44
G-1F		7	7	90	90	6.0	488	0.7	505	-5.3	17	-25.9	57
G-3F		7	7	90	90	4.7	462	1.3	444	-3.4	-18	-16.6	-61
K-2F		7	7	90	90	1.3	464	1.3	491	0	27	0	91
M-1F		7	7	90	90	3.3	431	1.3	463	-2.0	32	-9.8	108
M-2F		7	7	90	90	2.7	446	5.3	499	2.6	53	12.7	178
N-2F		7	7	90	90	3.3	466	1.3	479	-2.0	13	-9.8	44
N-3F		7	7	90	90	3.3	438	1.3	430	-2.0	-8	-9.8	-27
A-1C		8	8	90	90	5.3	375	2.0	359	-3.3	-16	-15.8	-56
A-3C		8	8	90	90	6.0	357	2.0	415	-4.0	58	-19.1	202
C-3C		8	8	90	90	6.0	403	6.7	421	0.7	18	3.4	63
E-3C		8	8	90	90	5.3	388	5.3	437	0	49	0	171
F-2C		8	8	90	90	6.0	376	4.0	402	-2.0	26	-9.6	91
H-1C		8	8	90	90	2.7	372	5.3	367	2.6	-5	12.4	-17
I-1C		8	8	90	90	4.7	377	6.7	387	2.0	10	9.6	35
I-2C		8	8	90	90	4.7	349	3.3	370	-1.4	21	-6.7	73
J-2C		8	8	90	90	4.0	363	7.3	397	3.3	34	15.8	119
K-2C		8	8	90	90	5.3	401	5.3	395	0	-6	0	-21
K-3C		8	8	90	90	6.0	393	6.0	403	0	10	0	35
C-2E		9	9	90	90	4.7	365	4.7	347	0	-18	0	165 -59
E-1N		9	9	90	90	2.7	391	3.3	306	0.6	-85	2.7	165 -280
I-1S		9	9	90	90	2.0	384	0.7	323	-1.3	-61	-5.8	165 -201
B-1W		9	9	90	90	4.0	377	4.7	299	0.7	-78	3.1	-257
B-1S		9	9	90	90	2.7	370	2.7	305	0	-65	0	-214
B-1W		9	9	90	90	6.7	385	4.0	339	-2.7	-46	-2.1	-152
A-1E		9	9	90	90	3.0	374	2.0	313	-1.0	-61	-4.5	-201
C-1E		9	9	90	90	4.0	371	6.0	319	2.0	-52	8.9	-171
E-1WQC		7	7	90	90	4.0	399	6.7	389	2.7	-10	13.2	-34
B-1WQC		7	7	90	90	2.7	341	6.0	369	3.3	28	16.1	94
K-3CQC		7	7	90	90	2.7	425	3.3	451	0.6	26	2.9	88
B-1WQC		7	7	90	90	3.3	409	4.7	425	1.4	16	6.8	54
A-3CQC		7	7	90	90	5.3	371	2.0	447	-3.3	76	-16.1	256

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

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3-44

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T771D	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.			
Building Information: Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/> Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/> Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls: Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS	[REDACTED]		2/3/00
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE	[REDACTED]	N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[REDACTED]		2/7/00
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS ^{EMM 7/14/00}	[REDACTED]		8/14/00
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date
NOT APPLICABLE	[REDACTED]	N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS ^{EMM 8/14/00}	[REDACTED]		8-14-00
RESS Manager Printed Name		RESS Manager Signature	Date

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: T771D	
Survey Area: Not Applicable		Survey Unit: Exterior	
Change #	Description	Initiator/ Date	PRE
1	a.) Incorporate Requirements of Letter RSR-001-00, dated 2/8/00 (See p. 8a/212)	MM 2/29/00	ABE
	b.) Incorporate requirements of Letter RSR-002-00, dated 2/9/00 (See p. 8c/212)		
	c.) Incorporate revision 1 to survey map. Square meter delineated when both dimensions > 0.25 meter.		
	d.) 50% of scan surveys shall be on roof.		
2	Update Survey Map to Rev. 2 due to extra meter in center of roof. Roof Update Only.	MM 3/15/00	ABE
3	Perform roof survey/sampling per Letter RSR-003-00 dated 3/9/00 (See p. 8h of 242)	MM 3/15/00	ABE
4	2 samples and 1 QC required per Characterization Package Supplement for Sampling and Analysis of Roofing Material from Groups B & C for Isotopic Analysis	KMY 4/1/00	ds
5	Roof survey/sampling performed per Letter KMY-003-00 (p. 8c of 212)	KMY 6/7/00	ds
6	Corrected scan requirement	KMY 7/11/00	ds

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T771D		Type: 1	
Survey Area: Not Applicable		Survey Unit: Exterior		Area (m ²): 162	
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	4/1000 2	0	Biased
Building:		Type: Change # 4 EBY 4/1/00		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T771D
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	EXTERIOR WALLS/ROOF: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4
	<u>QUALITY ASSURANCE SURVEYS</u>	SEE NOTE 5 SEE NOTE 6
	EXTERIOR WALLS/ROOF: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T771D
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning	<p>EXTERIOR WALLS/ROOF:</p> <p>Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p><i>less</i> No more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>EXTERIOR WALLS/ROOF:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

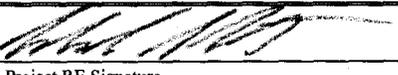
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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01		Building: T771D		
Survey Area: Not Applicable		Survey Unit: Exterior		
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.				
<input checked="" type="checkbox"/> Total Surface Activity		<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity		<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>				
RICK ROBERTS				2/3/00
Project RE Printed Name			Project RE Signature	Date
H.B. ESTABROOKS				2/3/00
RESS RE Printed Name			RESS RE Signature	Date

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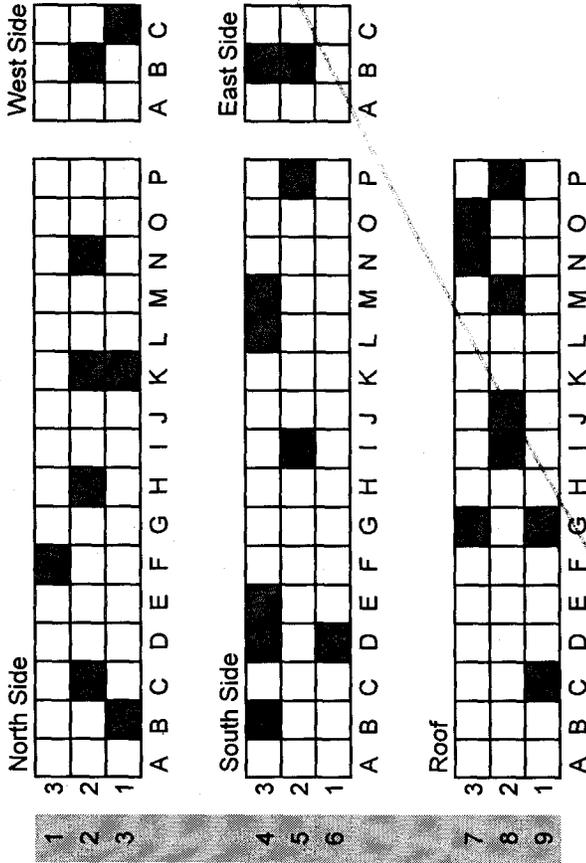
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SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T771D
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer was placed at its current location in 1969. This unit is 12'x40'x 10' high.	
Floor Area (m ²): 48	Total Area (m ²): 162
SEE ATTACHED SURVEY MAP	

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T771D Exterior



X-Coordinate: 8 Y-Coordinate: 6

= one square meter = direct & swipe

Total Surface Area = 162 m²
 10% Scan Surface Area = 16 m²

*Superseded
 MK 2/29/00*

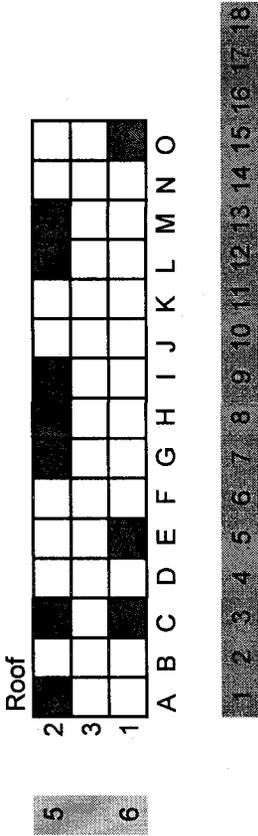
1	11	2	11	5	4	21	2	4
2	16	5	12	13	4	22	4	6
3	4	4	13	3	9	23	9	5
4	18	5	14	7	9	24	13	8
5	19	3	15	18	4	25	6	1
6	18	2	16	16	8	26	14	2
7	10	8	17	7	7	27	2	3
8	3	2	18	9	8	28	8	2
9	14	7	19	11	3			
10	15	7	20	12	4			

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3-56

604

T771D Exterior



X-Coordinate	Y-Coordinate
10	5

□ = one square meter
 ■ = direct & swipe

Total Surface Area = 113 m²

10% Scan Surface Area = 11.3 m²

One square meter added to center row of entire roof.
 Results of roof survey show elevated total alpha activity across roof area.

1	9	5	11	9	2	21	11	1	X	Y
2	3	5	12	14	3	22	1	5	X	Y
3	11	2	13	4	3	23	8	1	X	Y
4	9	3	14	15	6	24	7	5	X	Y
5	3	6	15	13	1	25	17	3	X	Y
6	12	5	16	8	3	26	13	2	X	Y
7	10	1	17	12	3	27	7	2	X	Y
8	10	2	18	11	4	28	13	5	X	Y
9	2	3	19	8	5				X	Y
10	17	1	20	5	6				X	Y

37a / 212

3/15/00

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(09/30/99)

APPENDIX A

Page 1 of 1

DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KDM / 6/1/00	
7.1[1]	DQOs implemented as prescribed	KDM / 6/1/00	
7.1[2]	All required supporting documents present	KDM / 6/1/00	
7.1[3]	Outliers / anomalies addressed	KDM / 6/1/00	
7.2	Data Validation	KDM / 6/1/00	
7.2.1	Survey/Sample Precision	KDM / 6/1/00	
7.2.2	Survey Accuracy	KDM / 6/1/00	see spreadsheets
	Sample Accuracy	KDM / 6/1/00	
7.2.3	Data Representative of survey unit	KDM / 6/1/00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM / 6/1/00	100%
7.2.5	Data Comparable to related units	KDM / 6/1/00	yes, Group B
7.3	DQA complete	KDM / 6/1/00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	KDM / 6/1/00	
7.3[4]	Mean > DCGL _w	NA	
7.3[5]	Any measurement > maximum DCGL	NA	
7.4	Evaluation	NA	
7.4[1][D]	New survey package (if req'd)	NA	
7.4[1][E]	Radiological improvement report (if req'd)	NA	
7.4[2]	Verify documentation complete	NA	
8.0	Peer review	DB 6/13/00	NONE
	Package submitted to project management	KDM / 8-14-00	
9.1	Records to Records Center (copy to project files)	KDM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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360

Survey Area: N/A
Survey Unit: Exterior
Building: T771D
Survey Unit Description: Roof and walls of T771D

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. Various notes are provided in the Survey Package. See Survey Package.
3. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
4. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
5. Spreadsheets provided to perform statistical calculations.
6. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
7. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
8. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. D. W. 6/1/00

**Removable Activity
(dpm/100 cm²) Alpha**

1.5
4.5
3.0
0.0
6.1
4.5
4.5
4.5
-1.5
3.0
0.0
4.5
0.0
-1.5
1.5
4.5
0.0
1.5
0.0
0.0
-1.5
0.0
0.0
0.0
1.5
6.1
0.0
1.5

Survey Area - N/A
Survey Unit - Exterior
Building - T771D
Survey Unit Description - Roof and walls of Trailer T771D
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 1.7 dpm/100 cm²
Std Dev 2.3 dpm/100 cm²

No measurement exceeds the DCGL_w

Removable Activity
(dpm/100 cm²) Beta

-52
 2
 -20
 -6
 18
 -6
 2
 -18
 -38
 16
 96
 -16
 -8
 -14
 26
 -20
 4
 -2
 18
 28
 -8
 0
 -10
 -10
 -18
 -18
 -14
 -28

Survey Area - N/A
 Survey Unit - Exterior
 Building - T771D
 Survey Unit Description - Roof and walls of Trailer T771D
 Removable Contamination Data Sheet
 DCGL_w 1000 dpm/100 cm²
 n 28
 Mean -3.4 dpm/100 cm²
 Std Dev 26.5 dpm/100 cm²
 No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

172.5
143.2
149.6
117.3
91.4
97.8
110.5
143.7
127.1
146.6
127.1
41.6
17.9
35.8
3.1
-2.9
22.3
31.9
-22.3
-6.2
0
9.3
-12.1
12.6
43.3
18.6
27.9
24.7

Survey Area - N/A
Survey Unit - Exterior
Building - T331A
Survey Unit Description - Roof and walls of Trailer T331A
Total Surface Activity Data Sheet

DCGL_w 100 dpm/100 cm²
n 28
Mean 59.7 dpm/100 cm²
Std Dev 61.0 dpm/100 cm²

Nine measurement exceeds the DCGL_w
Eleven measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
A-1N	41.6	32.3	9.3	36.95	25.16915
O-1E	-6.2	32.7	-38.9	13.25	-293.5849
C-2W	-12.1	38.6	-50.7	13.25	-382.6415
A-1W	0.0	29.3	-29.3	14.65	-200
C-1W	9.3	52.3	-43	30.8	-139.6104

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/61.0$
 $\Delta/\sigma_s = 0.8$
 Sign p = 0.788145
 N = 32.59
 $32.59 * 1.2 = 13.06$
 N = 39

Note: Where TSA results are elevated due to Po-210 concentrations, the Post Survey calculations can indicate that more survey points are needed. These numbers are artificially high because the elevated results are due to Po-210, and not due to DOE-added radionuclides. Consequently, where the presence of NORM (specifically Po-210) is confirmed through alpha spec analysis, Post Survey Statistics Calculations that use survey (TSA) results are not applicable as a means of checking TSA survey frequencies. Adequate survey frequency would be indicated if results attained from analytical samples were used instead.

**Total Surface Activity
(dpm/100 cm²) Beta**

-374
-471
-371
-561
117
-147
197
100
-508
60
-235
-151
87
47
50
134
-20
3
290
182
290
370
98
488
296
253
263
424

Survey Area - N/A
Survey Unit - Exterior
Building - T771D
Survey Unit Description - Roof and walls of Trailer T771D
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean 32.5 dpm/100 cm²
Std Dev 287.1 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
K-1S	50	54	-4	52	-7.692308
N-2S	-20	61	-81	20.5	-395.122
G-1N	-374	-155	-219	-264.5	82.79773
J-1N	-561	-108	-453	-334.5	135.426
M-1N	100	-168	268	-34	-788.2353

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/287.1$
 $\Delta/\sigma_s = 8.71$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

Survey Area: N/A	Survey Unit: EXTERIOR	Building: 7710
Survey Unit Description: ROOF Sample Locations		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

MADE LARSON RCT Printed Name	[REDACTED]	[Signature] RCT Signature	3-28-00 Date
Tom Bingham RCT Printed Name	[REDACTED]	[Signature] RCT Signature	3-28-00 Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

[REDACTED] RCT Printed Name	[REDACTED] Employee #	[Signature] RCT Signature	[REDACTED] Date
[REDACTED] RCT Printed Name	[REDACTED] Employee #	[Signature] RCT Signature	[REDACTED] Date
[REDACTED] RCT Printed Name	[REDACTED] Employee #	[Signature] RCT Signature	[REDACTED] Date
[REDACTED] RCT Printed Name	[REDACTED] Employee #	[Signature] RCT Signature	[REDACTED] Date
[REDACTED] RCT Printed Name	[REDACTED] Employee #	[Signature] RCT Signature	[REDACTED] Date

Survey Reviewed By

SCORNAU RCT Foreman Printed Name	[REDACTED]	[Signature] RCT Foreman Signature	3-29-00 Date
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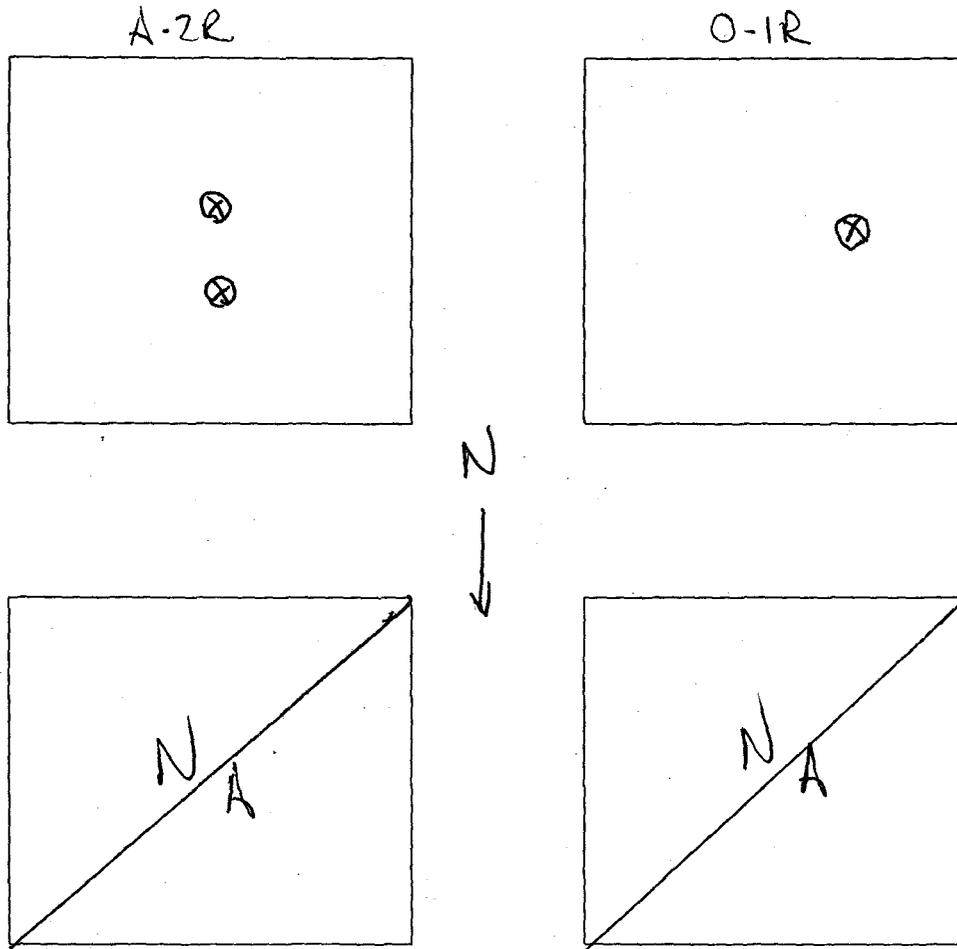
74

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: T771D
Survey Unit Description: Roof Sample Location		
RCT Initials/Date: NA 3/28/08	RCT Initials/Date: NA	RCT Initials/Date: NA

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



⊗ DENOTES SAMPLE CUTOUT

* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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Survey Area: NA	Survey Unit: Exterior	Building: T771D
Survey Unit Description Roof Sample Location		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE	EBERLINE	EBERLINE		
Model	SAC4	BC4	SAC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	823	966	1171	868		
Cal. Due Date	9/6/00	9/15/00	7/11/00	7/12/00		
Analysis Date	3/29/00	3/29/00	3/29/00	3/29/00		
Instrument Bkg. ^{cpm} 10-min count time	0.5	38.1	0.6	38.8		
Instrument Eff (%)	33	25	33	25		
Instrument MDA ^{dpm} 2-min count time	9.6	68.3	10.1	68.9	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		N.E. Tech.			
Model	Electra		Electra		Electra		Electra			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	2374	1919	2376	1921						
Cal. Due Date	9/8/00		8/23/00							
Survey Date	3/28/00		3/28/00							
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90 sec count time ^{cpm}	4.7	406	3.3	407					
Alpha Eff (%)	Beta Eff (%)	20.85	29.89	20.46	29.7					
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	48.2	262	42.6	264	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

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Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T771D</u>
Survey Unit Description: <u>Roof + Walls of Trailer T771D</u>		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

<u>ARICHO PACKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.4.00</u> Date
<u>ROBERT KEUKEY</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.4.00</u> Date
<u>PATRICK CHITUM</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.4.00</u> Date
<u>ARICHO PACKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.7.00</u> Date
<u>MARK LAWSON</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.7.00</u> Date
<u>PATRICK CHITUM</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.8.00</u> Date
<u>PATRICK CHITUM</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.7.00</u> Date

Quality Control Measurements Performed By

<u>PATRICK CHITUM</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.7.00</u> Date
<u>PATRICK CHITUM</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3.8.00</u> Date
	Employee #	<u>[Signature]</u> RCT Signature	Date
	Employee #	<u>[Signature]</u> RCT Signature	Date
	Employee #		

Survey Reviewed By

<u>Ron Worsta</u> Foreman Printed Name	[REDACTED]	<u>[Signature]</u> RCT Foreman Signature	<u>3-10-00</u> Date
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Survey Area: N/A	Survey Unit: EXTERIOR	Building: T7711
Survey Unit Description Roof + Walls of TRAILOR T7711		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE				
Model	SAR-4	BC-4				
Inst. ID #	1	2	3	4	5	6
Serial #	961	BC961				
Cal. Due Date	6-21-00	6-21-00				
Analysis Date	3-8-00	3-8-00				
Instrument Bkg cpm 10-min count time	0.5	40.0				
Instrument Eff (%)	33	25				
Instrument MDA 2-min count time dpm	9.6	69.9				

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model	Electra		Electra		Electra		ELECTRA		ELECTRA		ELECTRA	
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2385	1931	1395	1368	2376	1921	2376	1921	2376	1956	1395	1368
Cal. Due Date	6-14-00		7-19-00		8-23-00		8-23-00		5-3-00		7-19-00	
Survey Date	3-4-00		3-4-00		3-4-00		3-7-00		3-7-00		3-7-00	
Alpha Bkg 90-sec cpm count time	3.3	48.5	4.7	398	2.0	461	2.7	410	2.7	400	2.7	428
Beta Bkg 90-sec cpm count time												
Alpha Eff (%)	21.49	29.94	21.03	29.85	20.46	29.70	20.46	29.70	22.35	30.36	20.89	28.68
Beta Eff (%)												
Alpha MDA 90-sec dpm count time	40.5	286	47.8	258	35.1	281	39.3	265	36.0	256	38.5	280
Beta MDA 90-sec dpm count time												

Survey Area: NA	Survey Unit: Exterior	Building: T7715
Survey Unit Description Exterior Walls, Roof		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6 <i>31/60</i>
Serial #						
Cal. Due Date						
Analysis Date						
Instrument Bkg <i>cpm</i> 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time <i>dpm</i>						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	13 <i>7</i> <i>31/60</i>		8		9		10	11	12 <i>31/60</i>
Serial # / Probe #	2576 <i>1921</i>								
Cal. Due Date	8-23-00								
Survey Date	3-8-00								
Alpha Bkg 90-sec <i>cpm</i> count time	Beta Bkg 90-sec <i>cpm</i> count time								
Alpha Eff (%)	Beta Eff (%)								
Alpha MDA 90-sec <i>dpm</i> count time	Beta MDA 90-sec <i>dpm</i> count time								

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Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>N/A</u>				Survey Unit: <u>EXTENSION</u>			Building: <u>1771D</u>		
Survey Unit Description: <u>POINT ROOF INVESTIGATION + Q.C. SCAN</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
<u>99</u>			<u>Roof Investigation</u>						
<u>L-2R1</u>						<u>10</u>			<u>153</u>
<u>L-2R2</u>						<u>10</u>			<u>209</u>
<u>L-2R3</u>						<u>10</u>			<u>153</u>
<u>L-2R4</u>						<u>10</u>			<u>160</u>
<u>L-2R5</u>						<u>10</u>			<u>212</u>
<u>L-2R6</u>						<u>10</u>			<u>147</u>
<u>L-2R7</u>						<u>10</u>			<u>225</u>
<u>L-2R8</u>						<u>10</u>			<u>173</u>
<u>L-2R9</u>						<u>10</u>			<u>137</u>
<u>Q1</u>			<u>SCAN</u>						
<u>K-15</u>		<u>10</u>	<u>N</u>	<u>N/A</u>		<u>10</u>	<u>N</u>	<u>N/A</u>	<u>N/A</u>

$1m^2/100cm^2$
174.3
 dpm/100cm²

84

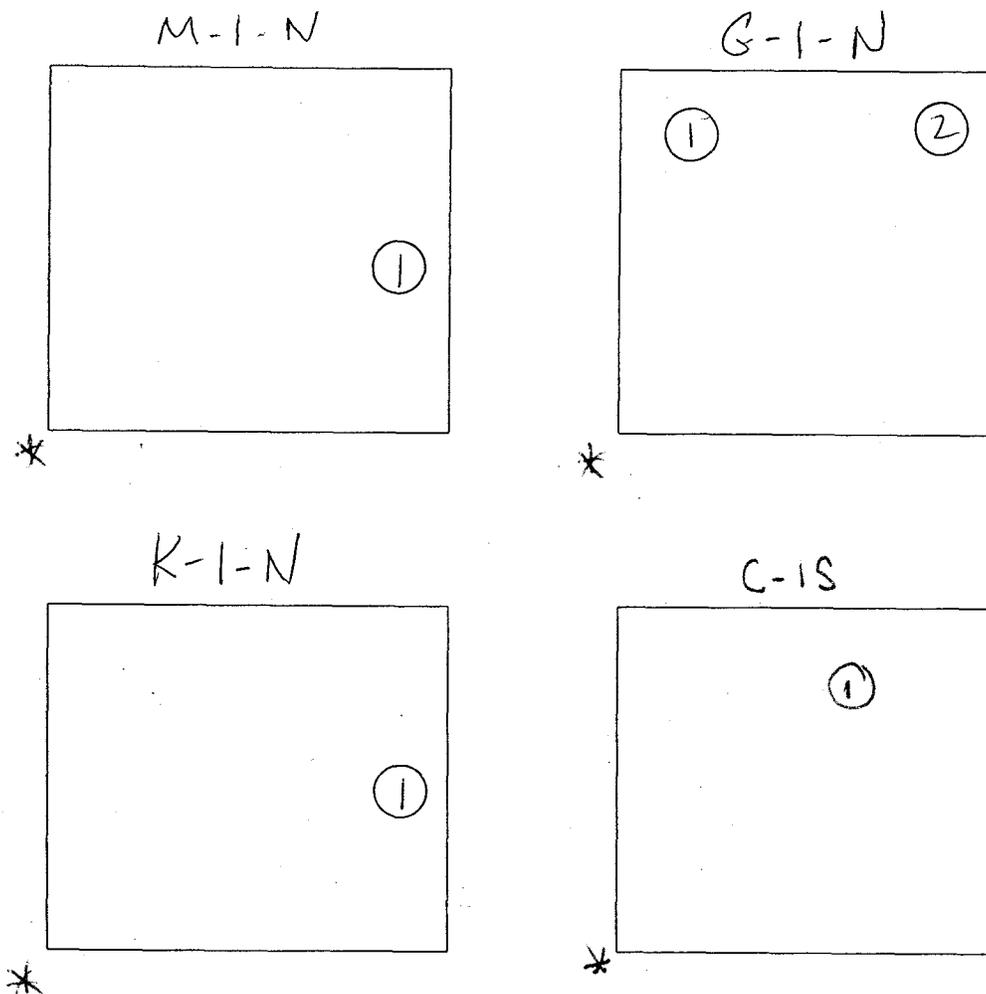
~

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T771D</u>
Survey Unit Description: <u>WALLS</u>		
RCT Initials/Date: <u>OP 3/7/00</u>	RCT Initials/Date: <u>NO 3-7-00</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

85

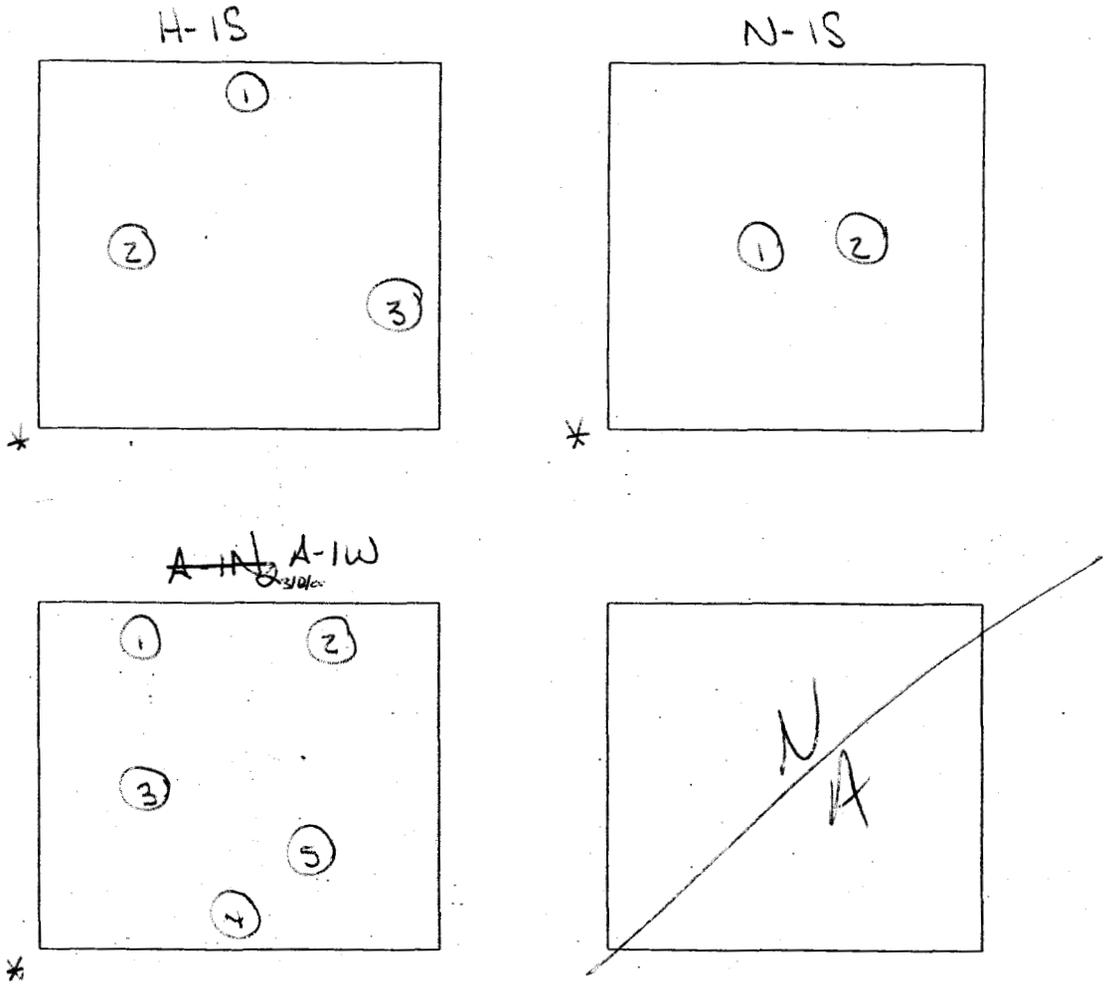
✓

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: T 771D
Survey Unit Description: WALLS		
RCT Initials/Date: NA 3-7-00	RCT Initials/Date: N/A	RCT Initials/Date: N/A

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

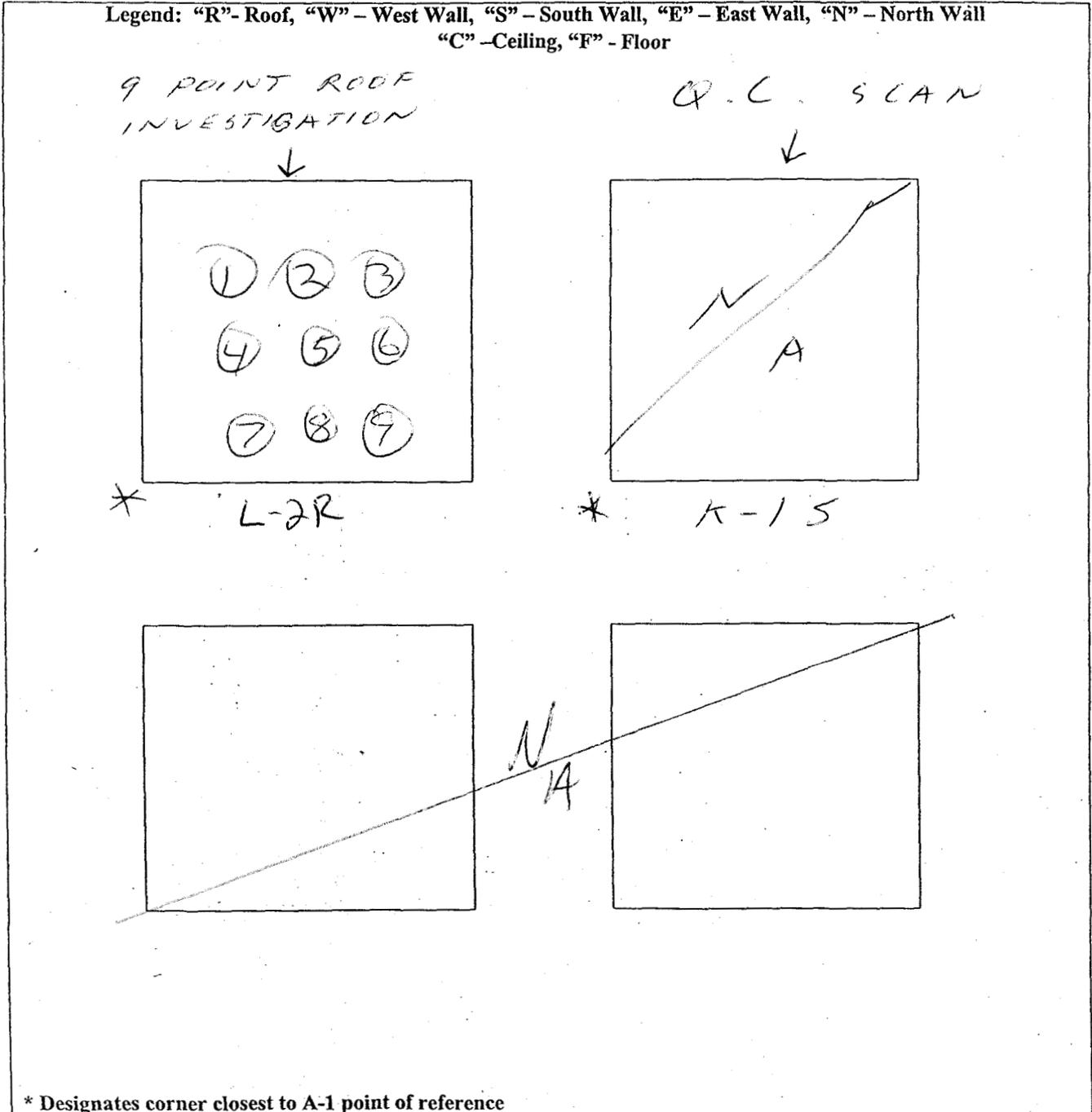
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>NA</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T 771 D</i>
Survey Unit Description: <i>9 POINT INVESTIGATION AND Q.C. SCAN</i>		
RCT Initials/Date: <i>PL 3-7-00</i>	RCT Initials/Date: <i>N/A</i>	RCT Initials/Date: <i>N/A</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



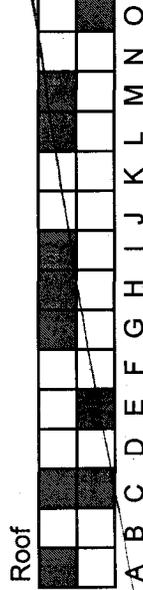
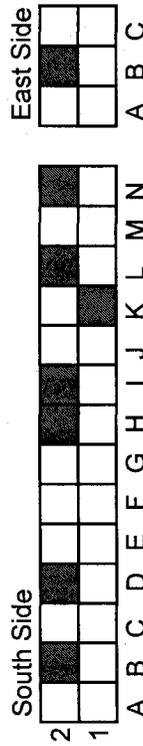
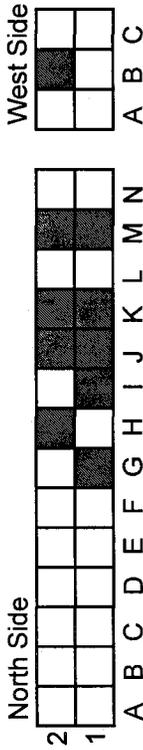
Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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T771D Exterior



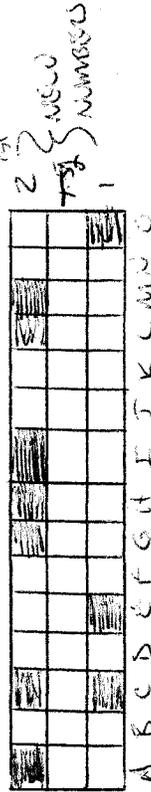
X-Coordinate	Y-Coordinate
8	2

= one square meter
 = direct & swipe

Total Surface Area = 98 m²

10% Scan Surface Area = 9.8 m²

*NEW GRID GRID:
 Consistent w/ Rev 2 Map
 provided in survey package*



1	9	5	11	21	11	1
2	3	5	12	14	3	5
3	11	2	13	4	3	8
4	9	3	14	15	6	7
5	3	6	15	13	1	3
6	12	5	16	8	3	2
7	10	1	17	12	3	2
8	10	2	18	11	4	5
9	2	3	19	8	5	
10	17	1	20	5	6	

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T771D</u>
Survey Unit Description: <u>ROOF + WALLS OF TRAILER T771D</u>		

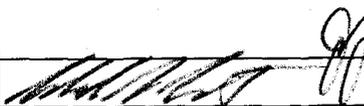
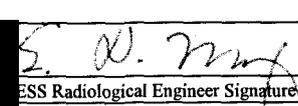
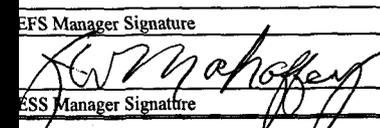
Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
B-W		7	7	90	90	4.7	480	8.7	368	4	-112	18.6	-374
H-2N		7	7	90	90	2.7	492	7.3	357	4.6	-141	21.4	-471
I-W		7	7	90	90	2.7	508	10	397	7.3	-111	34	-371
J-W		7	7	90	90	6.7	487	5.3	319	-1.4	-168	-6.5	-561
J-2N		7	7	90	90	6	323	13.3	358	7.3	35	34	117
K-W		7	7	90	90	4	429	6.7	385	2.7	-44	12.6	-147
K-2N		7	7	90	90	6	334	16.7	393	10.7	59	49.8	197
M-W		7	7	90	90	5.3	331	10.7	361	5.4	30	25.1	100
M-2N		7	7	90	90	3.3	473	5.3	321	2	-152	9.3	-508
B-2W		7	7	90	90	3.3	345	11.3	363	8	18	37.2	60
B-2S		8	8	90	90	10	386	14	326	4	-70	19.0	-235
D-2S		8	8	90	90	6.7	339	12	294	5.3	-45	25.2	-151
H-2S		8	8	90	90	6	311	13.3	337	7.3	26	34.7	87
I-2S		8	8	90	90	11	297	10.7	311	-0.3	14	-1.4	47
K-1S		8	8	90	90	6.7	277	10.7	292	4	15	19	50
L-2S		8	8	90	90	9.3	291	10	331	0.7	40	31.3	134
N-2S		8	8	90	90	8	296	13.3	290	5.3	-6	25.2	-20
B-2E		8	8	90	90	5.3	289	12.7	290	7.4	1	35.2	3
A-2R		9	9	90	90	0.7	439	35.3	525	34.6	86	169.1	290
C-1R		9	9	90	90	3.3	445	36	499	32.7	54	75.8	182
C-2R		9	9	90	90	4	425	40.7	511	36.7	86	179.4	290
E-1R		9	9	90	90	3.3	455	27.3	565	24	110	117.3	320
G-2R		9	9	90	90	8.7	484	40.7	573	32	29	156.4	98
H-2R		9	9	90	90	4	414	55.3	559	51.3	145	250.7	488
I-2R		9	9	90	90	6.7	427	57.3	515	50.6	88	247.3	296
L-2R		9	9	90	90	2.7	455	58.7	530	56	75	273.7	253
M-2R		9	9	90	90	6	433	2.7	511	26.7	78	130.5	263
D-1R		9	9	90	90	8	409	55.3	535	47.3	126	231.2	424
K-1SQC		13	13	90	90	2.7	353	4.7	369	2	16	9.8	5354
N-2SQC		13	13	90	90	2.7	323	9.3	341	6.6	18	32.3	61
G-1SQC		13	13	90	90	1.3	384	9.3	348	8	-46	39.1	-155
J-1SQC		13	13	90	90	4.7	417	14	385	9.3	-32	45.5	-108
H-1SQC		13	13	90	90	2.7	406	12.7	356	10	-50	48.9	-168

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" - local area background.

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS	[REDACTED]		2/3/00
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[REDACTED]		2/3/00
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS <i>Elmer 7/14/00</i>	[REDACTED]		8/14/00
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS <i>8/14/00</i>	[REDACTED]		8-14-00
RESS Manager Printed Name		RESS Manager Signature	Date

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T331		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior		Area (m ²): 138	
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area: 0	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T331
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	INTERIOR FLOORS/WALLS/CEILINGS: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6
	<u>QUALITY ASSURANCE SURVEYS</u> INTERIOR FLOORS/WALLS/CEILINGS: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T331
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning Change #3 KRM 9-11-00 Change #2 KRM 9-11-00	<p>INTERIOR FLOORS:</p> <p>Biased surface scans will be performed on the interior floors^{walls} in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring.</p> <p>No more^{less} than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>INTERIOR FLOORS:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

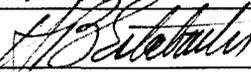
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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.			
<input checked="" type="checkbox"/> Total Surface Activity		<input type="checkbox"/> Media Surface Activity	
<input checked="" type="checkbox"/> Removable Surface Activity		<input type="checkbox"/> Volumetric Surface Activity	
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS			2/3/00
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS			2/7/00
RESS RE Printed Name		RESS RE Signature	Date

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SURVEY PACKAGE SURVEY MAP

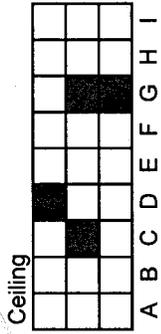
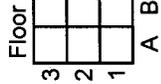
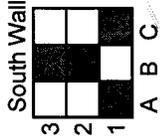
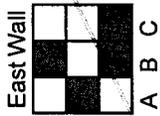
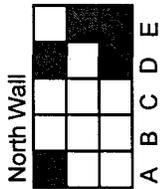
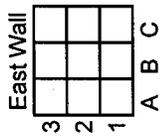
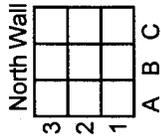
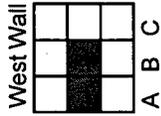
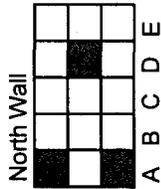
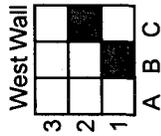
Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Floor Area (m²): 27	Total Area (m²): 138
SEE ATTACHED SURVEY MAP	

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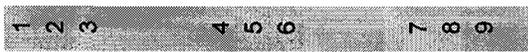
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T331 Interior

West Room



*Supervised
 MA 2/24/00*



X-Coordinate	Y-Coordinate
9	1

□ = one square meter
 ■ = direct & swipe

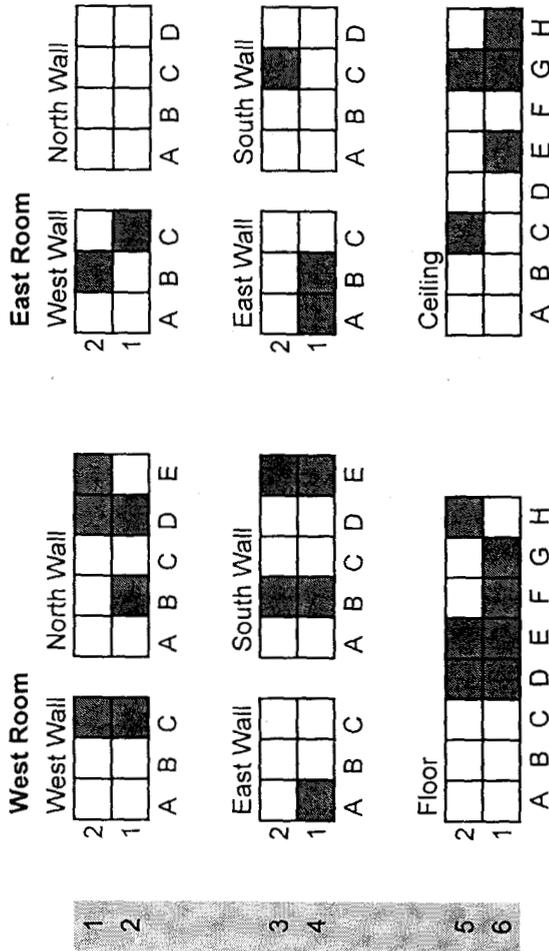
Total Surface Area = 138 m²

10% Scan Surface Area = 14 m²

1	5	1	11	6	8	21	16	9
2	5	8	12	15	6	22	12	6
3	15	4	13	10	6	23	11	4
4	13	7	14	9	6	24	9	5
5	8	2	15	12	8	25	3	8
6	16	8	16	14	5	26	5	4
7	6	7	17	11	5	27	14	2
8	3	2	18	5	3	28	8	4
9	8	6	19	15	2			
10	2	3	20	16	6			

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T331 Interior



X-Coordinate	Y-Coordinate
9	1

= one square meter
 = direct & swipe

Total Surface Area = 92 m²
 10% Scan Surface Area = 9.2 m²

1	9	1	11	8	5	21	12	2
2	4	6	12	11	1	22	1	4
3	6	6	13	3	1	23	8	2
4	12	5	14	5	5	24	16	3
5	5	6	15	6	3	25	4	5
6	10	4	16	17	6	26	7	6
7	11	4	17	8	1	27	14	6
8	6	2	18	9	3	28	16	5
9	6	4	19	9	4			
10	16	6	20	3	2			

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SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion	RCT Supervisor	PRE	
Scan Surveys	<i>[Signature]</i> 6-5-00	EDM	
Total Activity Surveys	<i>[Signature]</i> NA 6/11/00	EDM	NA 6/11/00
Exposure Rate Surveys	NA	NA	
Removable Surveys	<i>[Signature]</i>	EDM	
Media Samples	NA	NA	
Volumetric Samples	NA	NA	
All Surveys and Samples Accounted For	RCT Supervisor	PRE	
Scan Surveys	<i>[Signature]</i>	EDM	
Total Activity Surveys	<i>[Signature]</i>	EDM	
Exposure Rate Surveys	NA	NA	
Removable Surveys	<i>[Signature]</i>	EDM	
Media Samples	NA	NA	
Volumetric Samples	NA	NA	
Comments:			
<i>[Signature]</i> RICK ROBERTS EDM 7/11/00	[Redacted]	<i>[Signature]</i>	6-5-00
RCT Supervisor Printed Name		RCT Supervisor Signature	Date
Project RE Printed Name		Project RE Signature	Date
H. B. ESTABROOKS J.W. Mohaffey	[Redacted]	<i>[Signature]</i>	8-14-00
RESS Manager Printed Name		RESS Manager Signature	Date

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	EDM/3-14-00	
7.1[1]	DQOs implemented as prescribed	EDM/3-14-00	
7.1[2]	All required supporting documents present	EDM/3-20-00	
7.1[3]	Outliers / anomalies addressed	EDM/3-20-00	
7.2	Data Validation	KDM/3-20-00	
7.2.1	Survey/Sample Precision	EDM/3-20-00	see spreadsheets
7.2.2	Survey Accuracy	EDM/3-20-00	
	Sample Accuracy	KDM/3-20-00	
7.2.3	Data Representative of survey unit	KDM/3-20-00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM/3-20-00	100%
7.2.5	Data Comparable to related units	KDM/3-20-00	yes, Group B
7.3	DQA complete	EDM/3-20-00	
7.3[3]	Any measurement > DCGL _w ?	N/A	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	dr 6/13/00	NONE
	Package submitted to project management	EDM/3-20-00	
9.1	Records to Records Center (copy to project files)	EDM/8-27-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Interior
Building: T331
Survey Unit Description: Walls, floors and ceiling of T331

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: S. J. [Signature]

S. J. [Signature]

Removable Activity
(dpm/100 cm²) Alpha

1.5
0.3
0.0
1.8
-1.5
1.8
0.0
-1.2
-1.5
3.3
-1.5
1.8
0.0
1.8
0.0
3.3
0.0
-1.2
1.5
4.8
0.0
1.8
3.0
0.3

Survey Area - N/A
Survey Unit - Interior
Building - T331
Survey Unit Description - Walls, ceiling and floor of Trailer T331
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 0.8 dpm/100 cm²
Std Dev 1.8 dpm/100 cm²

No measurement exceeds the DCGL_w

**Removable Activity
(dpm/100 cm²) Beta**

8
 -15.2
 -22
 2.8
 -12
 -11.2
 -18
 20.8
 20
 -33.2
 -12
 -9.2
 -8
 -15.2
 -20
 -3.2
 -12
 -5.2
 -24
 -5.2
 -40
 26.8
 44
 20.8
 40
 0.8
 8
 28.8

Survey Area - N/A
 Survey Unit - Interior
 Building - T331
 Survey Unit Description - Walls, ceiling and floor of Trailer T331
 Removable Contamination Data Sheet
 DCGL_w 1000 dpm/100 cm²
 n 28
 Mean -1.6 dpm/100 cm²
 Std Dev 21.2 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

Survey Area - N/A
 Survey Unit - Interior
 Building - T331
 Survey Unit Description - Walls, ceiling and floor of Trailer T331

Total Surface Activity Data Sheet
 DCGL_w 100 dpm/100 cm²
 n 28
 Mean 16.5 dpm/100 cm²
 Std Dev 17.6 dpm/100 cm²

No measurement exceeds the DCGL_w
 No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
D-1F	-6.8	8.9	-15.7	1.05	-1495.238
E-1F	45.9	41.6	4.3	43.75	9.828571
F-1F	22.5	30.0	-7.5	26.25	-28.57143
C-1W	24.3	38.5	-14.2	31.4	-45.22293
B-2W	51.8	21.0	30.8	36.4	84.61538

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/17.6$
 $\Delta/\sigma_s = 2.84$ (default 2.5)
 Sign p = 0.993790
 N = 11.10
 $11.10 * 1.2 = 13.32$
 N = 14

111

**Total Surface Activity
(dpm/100 cm²) Beta**

741
-61
593
226
-205
-88
7
-10
-148
-54
-141
-135
-222
-32
-235
-167
58
45
-171
-328
-341
-164
-303
-190
-232
-132
-177
-235

Survey Area - N/A
Survey Unit - Interior
Building - T331
Survey Unit Description - Walls, ceiling and floor of Trailer T331
Total Surface Activity Data Sheet

DCGL_w 5000 dpm/100 cm²

n 28

Mean -75.0 dpm/100 cm²

Std Dev 244.6 dpm/100 cm²

No measurement exceeds the DCGL_w

No measurement exceeds 75% of the the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
D-1F	741	527	214	634	33.75394
E-1F	593	280	313	436.5	71.70676
F-1F	7	-7	14	0	0
C-1W	-232	-369	137	-300.5	-45.59068
B-2W	-190	10	-200	-90	222.2222

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$$

$$\Delta/\sigma_s = (5000-2500)/244.6$$

$$\Delta/\sigma_s = 10.22 \text{ (default to 3)}$$

$$\text{Sign } p = 0.998650$$

$$N = 10.88$$

$$10.88 * 1.2 = 13.05$$

$$N = 14$$

Survey Area: NA	Survey Unit: [REDACTED]	Building: [REDACTED]
Survey Unit Description		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

[REDACTED]	P. Chittum	[REDACTED]	[Signature]	3-6-00
	RCT Printed Name		RCT Signature	Date
	A. PARKER	[REDACTED]	[Signature]	3-6-00
	RCT Printed Name		RCT Signature	Date
	Robert Keenan	[REDACTED]	[Signature]	3-10-00
	RCT Printed Name		RCT Signature	Date
	A. PARKER	[REDACTED]	[Signature]	3-10-00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

[REDACTED]	M. Lawson	[REDACTED]	[Signature]	3-10-00
	RCT Printed Name		RCT Signature	Date
	Robert Keenan	[REDACTED]	[Signature]	3-10-00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Row Worster	[REDACTED]	[Signature]	3-11-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: NA	Survey Unit: <i>Basement</i>	Building: T331
Survey Unit Description <i>Water Damage Room</i>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>		
Model	<i>SAC-4</i>	<i>SA-1</i>	<i>SA-1</i>	<i>SA-1</i>		
Inst. ID #	1	2	3	4	5	6
Serial #	<i>1170</i>	<i>1171</i>	<i>1172</i>	<i>1173</i>		
Cal. Due Date	<i>6-30-00</i>	<i>7-1-00</i>	<i>7-23-00</i>	<i>7-22-00</i>		
Analysis Date	<i>3-10-00</i>	<i>3-12-00</i>	<i>3-10-00</i>	<i>3-10-00</i>		
Instrument Bkg <i>cpm</i> 10-min count time	<i>0.5</i>	<i>3.4</i>	<i>40.0</i>	<i>48.3</i>		
Instrument Eff (%)	<i>33</i>	<i>33</i>	<i>25</i>	<i>25</i>		
Instrument MDA 2-min count time <i>dpm</i>	<i>9.6</i>	<i>9.0</i>	<i>66.9</i>	<i>70.1</i>		

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		<i>MS Comp</i>			
Model	<i>Electra</i>		<i>Electra</i>		<i>Electra</i>		<i>SA-1 PR</i>			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	<i>1552</i>	<i>143</i>	<i>7376</i>	<i>721</i>	<i>2375</i>	<i>1950</i>	<i>3070</i>	<i>120</i>		
Cal. Due Date	<i>8-3-00</i>		<i>7-12-00</i>		<i>5-3-00</i>		<i>8-27-00</i>		<i>8-23-00</i>	
Survey Date	<i>3-6-00</i>		<i>3-6-00</i>		<i>3-10-00</i>		<i>3-10-00</i>			
Alpha Bkg 90-sec <i>cpm</i> count time	<i>2.7</i>	<i>35.4</i>	<i>3.3</i>	<i>23.6</i>	<i>0.0</i>	<i>2.61</i>	<i>3.0</i>	<i>22.5</i>		
Beta Bkg 90-sec <i>cpm</i> count time										
Alpha Eff (%)	<i>21.8</i>	<i>31.0%</i>	<i>20.4%</i>	<i>22.2</i>	<i>27.5%</i>	<i>32.8%</i>	<i>23.4%</i>	<i>23.0%</i>		
Beta Eff (%)										
Alpha MDA 90-sec <i>dpm</i> count time	<i>36.9</i>	<i>236</i>	<i>42.6</i>	<i>201</i>	<i>8.1</i>	<i>244</i>	<i>41.0</i>	<i>299</i>		
Beta MDA 90-sec <i>dpm</i> count time										

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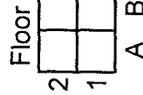
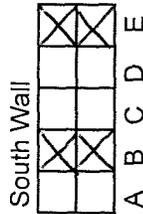
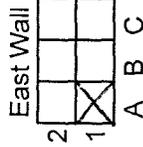
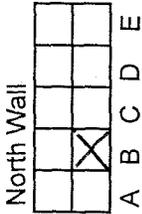
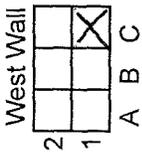
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Scas Locations:

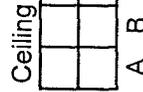
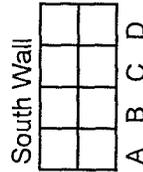
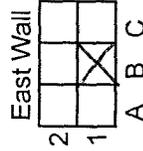
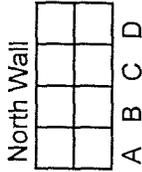
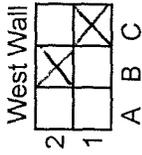
1 2 3 4 5 6

T331 Interior

West Room



East Room



*Notes: Scas only on West Wall of East Room
 but not on South Wall
 Scas on South Wall of West Room
 but not on East Wall*

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

3 see 10

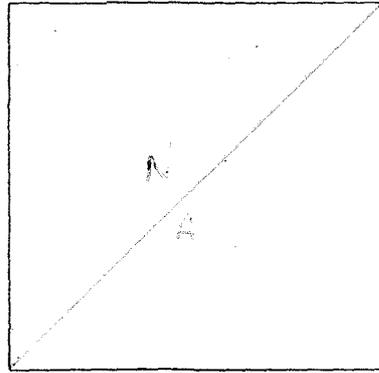
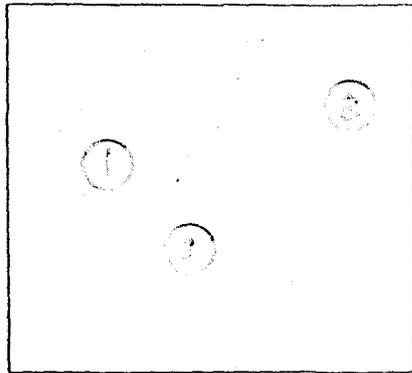
Handwritten mark

Final Survey NE Electra Scan & Investigation Survey Map

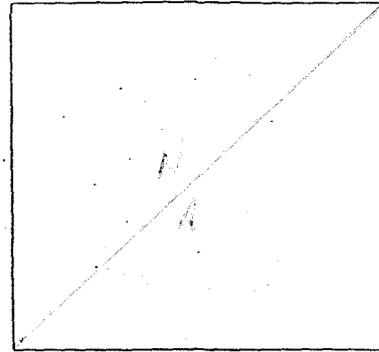
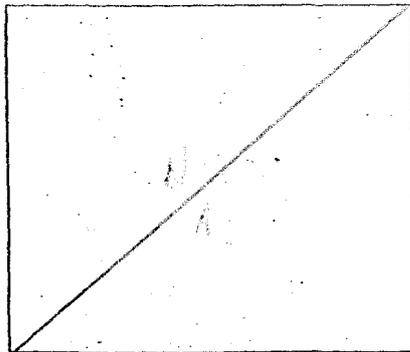
Survey Area: <i>N/A</i>	Survey Unit: <i>Traverse</i>	Building: <i>T351</i>
Survey Unit Description: <i>Traverse of Trance T351</i>		
RCT Initials/Date: <i>DB 3/1/00</i>	RCT Initials/Date: <i>N/A</i>	RCT Initials/Date: <i>1/1</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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3-108

4 nr 10

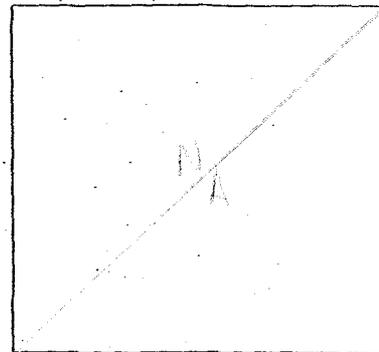
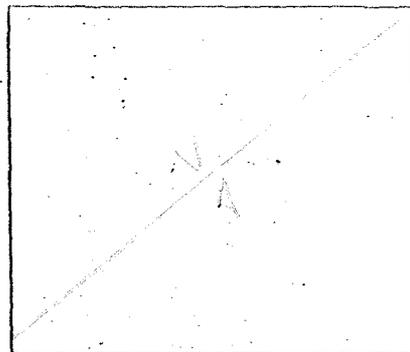
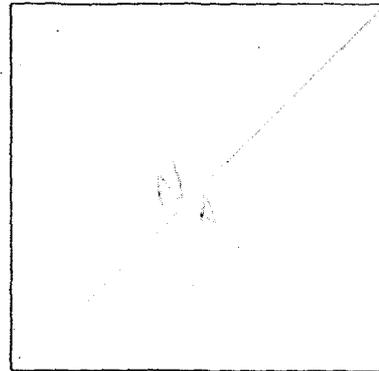
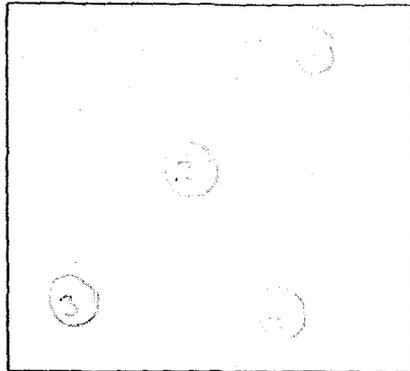
[Handwritten mark]

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>NA</u>	Survey Unit: <u>Basement</u>	Building: <u>1331</u>
Survey Unit Description: <u>Basement</u>		
RCT Initials/Date: <u>ML 3-10-2002</u>	RCT Initials/Date: <u>JLH</u>	RCT Initials/Date: <u>JLH</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" -Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

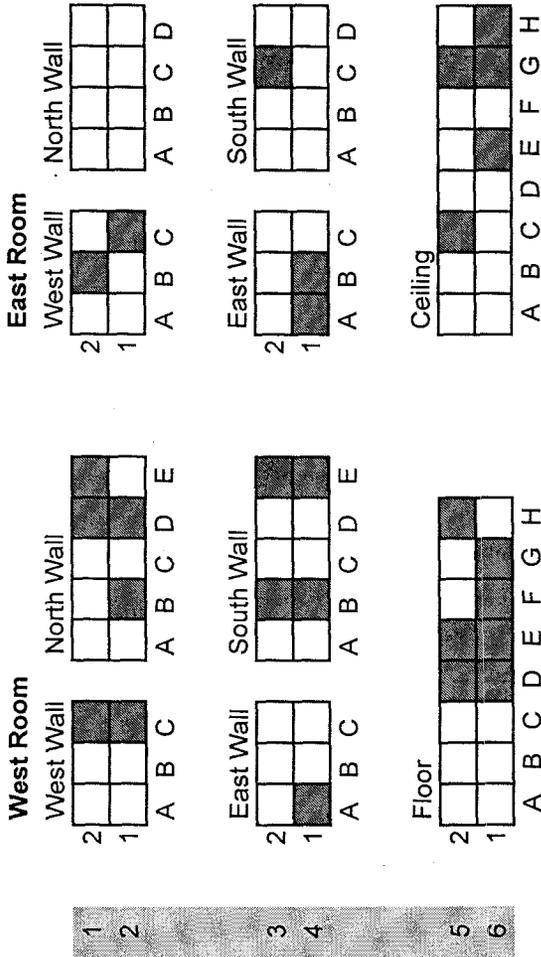
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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T331 Interior



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

= one square meter
 = direct & swipe

X-Coordinate	Y-Coordinate
9	1

Total Surface Area = 92 m²
 10% Scan Surface Area = 9.2 m²

1	9	1	11	8	5	21	12	2
2	4	6	12	11	1	22	1	4
3	6	6	13	3	1	23	8	2
4	12	5	14	5	5	24	16	3
5	5	6	15	6	3	25	4	5
6	10	4	16	17	6	26	7	6
7	11	4	17	8	1	27	14	6
8	6	2	18	9	3	28	16	5
9	6	4	19	9	4			
10	16	6	20	3	2			

Survey Area: <u>NA</u>	Survey Unit: <u>2nd floor</u>	Building: <u>T331</u>
Survey Unit Description <u>Whole floor</u>		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
MAIN				90	90								
D-1F		8	8	90	90	6.7	537	5.5	609	-1.4	220	-6.8	741
D-2F		8	8	90	90	2.0	731	1.5	410	8	-18	39.1	-61
E-1F		8	8	90	90	3.3	452	1.7	602	4.4	176	45.4	593
E-2F		8	8	90	90	2.0	453	1.5	477	4	67	16.6	226
E-1C		8	8	90	90	5.3	458	3.3	391	-2	-61	-9.8	-205
C-2C		8	8	90	90	6.0	442	1.4	396	6	-26	29.3	-88
F-1F		8	8	90	90	2.7	426	2.3	485	4.6	2	22.5	7
G-1F		8	8	90	90	4.7	435	3.3	435	-1.4	-3	-6.0	-10
G-1C		8	8	90	90	2.2	455	1.2	361	0	-14	0	-146
G-2C		8	8	90	90	1.2	422	1.7	372	4	-16	19.6	-34
H-2F		8	8	90	90	1.2	409	1.2	406	4.6	-42	26.5	-141
H-1C		8	8	90	90	2.2	401	1.4	377	-2	-40	-9.8	-135
WEST				90	90								
G-1W		7	7	90	90	4.2	321	3.2	302	-0.7	-69	-3.2	226
C-2W		7	7	90	90	3.5	391	6.2	307	3.4	-10	15.6	-52
B-1N		7	7	90	90	1.3	324	2.7	321	6	-73	21.5	-235
D-1N		7	7	90	90	1.2	324	1.2	332	4	52	18.3	-167
D-2N		7	7	90	90	2.5	307	1.4	283	10	18	45.4	58
E-2N		7	7	90	90	1.2	244	3.2	249	-0.7	14	-3.2	45
A-1E		7	7	90	90	5.2	314	7.4	324	3.4	-53	15.6	-171
B-1S		7	7	90	90	3.2	333	4.4	321	1.4	-100	6.4	-320
B-2S		7	7	90	90	3.7	373	4.0	277	3.3	-100	15.1	-341
E-1S		7	7	90	90	3.7	321	1.3	322	5.6	-51	39.4	-164
E-2S		7	7	90	90	4.7	343	5.3	249	0.6	-94	2.8	-505
				90	90								
				90	90								
MAIN D	IE QC			90	90	4.0	406	6.2	566	2	160	59	527
MAIN E	IE QC			90	90	2.7	409	12.0	401	9.3	85	41.4	280
MAIN F	IE QC			90	90	3.3	436	10.0	431	6.7	-2	30.0	-7
	QC			90	90								
	QC			90	90								

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

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Survey Area: NA	Survey Unit: Interior	Building: T551
Survey Unit Description Halls, Corridor, Floor		

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
		MAIN							
D-2F		1	3	1.6	4.2	0.2	2.7	1.5	8.2
D-1F		2	4	0.5	2.5	0.2	1.3	0.9	4.5
E-1F		1	3	0.5	1.5	0.2	0.5	0.3	1.5
E-2F		2	4	1.0	1.5	0.2	0.7	0.8	2.2
F-1F		1	3	0.0	1.2	0.2	0.3	0.5	1.8
G-1F		2	4	1.0	3.5	0.5	2.8	1.5	11.2
H-2F		1	3	0.5	2.2	0.2	1.5	0.9	4.2
G-2C		2	4	0.0	1.5	0.2	0.5	0.0	1.2
E-1C		1	3	0.0	1.5	0.2	0.5	0.2	2.2
G-1C		2	4	1.5	2.5	0.2	1.2	3.3	3.2
G-2C		1	3	0.0	1.2	0.2	0.5	0.0	1.2
H-1C		2	4	1.0	2.2	0.5	1.5	1.2	4.2
WEST									
C-1W		1	3	0.5	1.2	0.2	0.5	0.0	0.8
C-2W		2	4	1.0	2.5	0.5	1.8	1.2	4.2
B-1N		1	3	0.5	1.5	0.2	0.8	0.0	2.0
D-1N		2	4	1.5	3.5	1.1	2.2	4.5	8.2
D-2N		1	3	3.5	3.2	0.5	1.5	0.0	1.2
E-2N		2	4	0.0	1.2	0.2	0.5	0.2	1.2
A-1E		1	3	2.0	2.4	1.5	1.0	4.5	2.2
B-1E		2	4	0.5	1.2	0.2	0.8	0.2	1.2
B-2S		1	3	0.5	1.0	0.2	0.5	0.0	1.2
E-1S		2	4	0.0	1.2	0.2	0.5	0.2	1.2
E-2S		1	3	1.0	1.2	0.5	0.8	0.5	1.2
EAST									
B-2W		2	4	2.0	4.5	1.5	3.2	4.8	20.2
C-1W		1	3	0.5	1.2	0.2	0.8	0.0	1.2
A-1E		2	4	1.0	4.2	0.5	2.2	1.8	0.2
B-1E		1	3	1.5	1.2	0.5	1.0	3.0	1.2
C-2S		2	4	0.5	1.2	0.2	0.8	0.3	1.2

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2

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS		[Redacted Signature]	
Radiological Engineer Printed Name		Radiological Engineer Signature	
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	
H. B. ESTABROOKS		[Redacted Signature]	
RESS Manager Printed Name		RESS Manager Signature	
Date		2/1/00	
Survey Package Closure:			
RICK ROBERTS		[Redacted Signature]	
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	
H. B. ESTABROOKS		[Redacted Signature]	
RESS Manager Printed Name		RESS Manager Signature	
Date		8-14-00	

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Exterior	
Change #	Description	Initiator/ Date	PRE
1	a.) Insurgate requirements of letter RSR-001-00, dated 2/2/00 (See p. 8 of 212)	MH 2/2/00	MH
	b.) Insurgate requirements of Letter RSR-002-00, dated 2/11/00 (See p. 9 of 212)		
	c.) Insurgate revision to survey and square meter delineated area with dimensions 20.25 meters		
	d.) SD% of area sample shall be in the north		
2	Perform roof survey/sampling per Letter RSR-003-00 dated 3/19/00 (See p. 8h of 242)	MH 3/19/00	MH
3	2 samples & 1 QC sample required per Characterization Package Supplement for Sampling and Analysis of Roofing Material from Groups B & C for Isotopic Analysis	EDM 4/1/00	ds
4	Roof survey/sampling performed per Letter EDM-003-00 (p. 8i of 242)	EDM 6/7/00	ds
5	Correct SD requirements	EDM 7/1/00	ds

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T331		Type: 1	
Survey Area: Not Applicable		Survey Unit: Exterior		Area (m ²): 99	
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	<i>4/1/00</i> 2	0	Biased
Building:		Type: <i>Change #3 from 4/1/00</i>		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T331
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	EXTERIOR WALLS/ROOF: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6
	<u>QUALITY ASSURANCE SURVEYS</u> EXTERIOR WALLS/ROOF: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T331
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning	<p>EXTERIOR WALLS/ROOF:</p> <p>Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p>No more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>EXTERIOR WALLS/ROOF:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T331		
Survey Area: Not Applicable	Survey Unit: Exterior		
Survey Unit Description: This trailer is a 27'X 8' combination shower and toilet skid mounted facility. Its present condition is poor.			
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS			4/2/00
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS			2/2/10
RESS RE Printed Name		RESS RE Signature	Date

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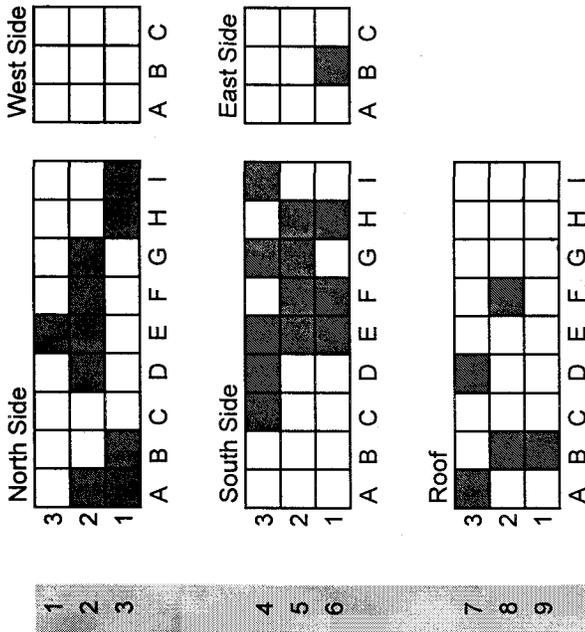
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SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T331
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 27' X 8' combination shower and toilet skid mounted facility. Its present condition is poor.	
Floor Area (m²): 27	Total Area (m²): 99
SEE ATTACHED SURVEY MAP	

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T331 Exterior



Signature
Date

X-Coordinate	Y-Coordinate
6	6

= one square meter

= direct & swipe

Total Surface Area = 99 m²

10% Scan Surface Area = 10 m²

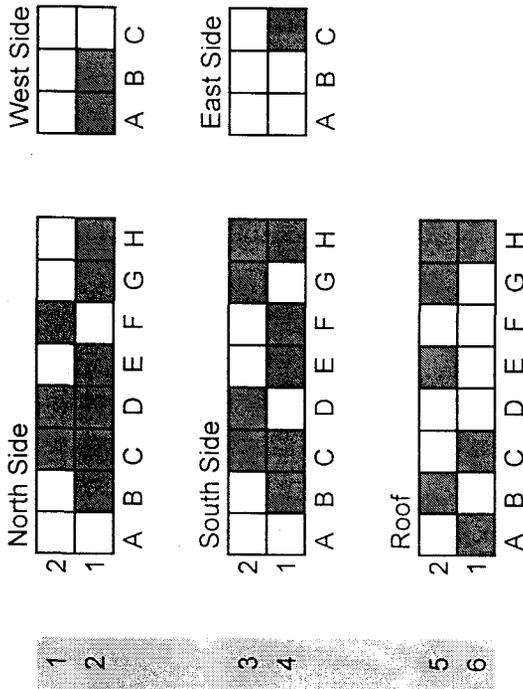
1	5	1	11	3	4	21	6	6
2	5	2	12	11	6	22	7	5
3	5	5	13	9	4	23	6	2
4	1	3	14	8	6	24	2	8
5	5	6	15	4	7	25	4	2
6	7	2	16	4	4	26	2	3
7	1	7	17	6	5	27	6	8
8	9	3	18	1	2	28	7	4
9	8	5	19	8	3			
10	5	4	20	2	9			

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T331 Exterior



X-Coordinate	Y-Coordinate
10	4

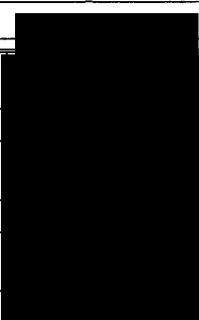
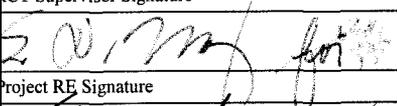
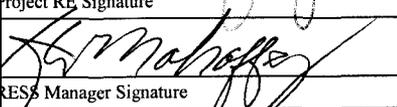
= one square meter
 = direct & swipe

1	3	6	11	4	1	21	1	6
2	4	2	12	3	2	22	8	2
3	5	2	13	9	2	23	8	4
4	5	5	14	7	2	24	6	4
5	2	4	15	3	4	25	8	3
6	4	3	16	8	6	26	7	3
7	2	5	17	10	2	27	2	2
8	8	5	18	6	1	28	3	3
9	3	1	19	11	4			
10	5	4	20	7	5			

Total Surface Area = 60 m²

10% Scan Surface Area = 6 m²

SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: T331	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion		RCT Supervisor	PRE
Scan Surveys		<i>N</i>	KDM
Total Activity Surveys		<i>N</i>	KDM
Exposure Rate Surveys		NA	NA
Removable Surveys		<i>N</i>	KDM
Media Samples		<i>N</i>	KDM
Volumetric Samples		NA	NA
All Surveys and Samples Accounted For		RCT Supervisor	PRE
Scan Surveys		<i>N</i>	KDM
Total Activity Surveys		<i>N</i>	KDM
Exposure Rate Surveys		NA	NA
Removable Surveys		<i>N</i>	KDM
Media Samples		<i>N</i>	KDM
Volumetric Samples		NA	NA
Comments:			
<i>Bob W...</i> RCT Supervisor Printed Name		 RCT Supervisor Signature	
RICK ROBERTS Project RE Printed Name		 Project RE Signature	
H. B. ESTABROOKS RESS Manager Printed Name		 RESS Manager Signature	
		Date 6-12-00 8-14-00	

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	EDM/3-20-00	
7.1[1]	DQOs implemented as prescribed	EDM/3-20-00	
7.1[2]	All required supporting documents present	EDM/3-20-00	
7.1[3]	Outliers / anomalies addressed	EDM/3-20-00	
7.2	Data Validation	EDM/3-20-00	
7.2.1	Survey/Sample Precision	EDM/3-20-00	see spreadsheets
7.2.2	Survey Accuracy	EDM/3-20-00	
	Sample Accuracy	EDM/6/1/00	
7.2.3	Data Representative of survey unit	EDM/3-20-00	
7.2.4	Survey/Sample/Scan Completeness	EDM/6/1/00	
7.2.5	Data Comparable to related units	EDM/3-20-00	yes, Group B
7.3	DQA complete	EDM/6/1/00	
7.3[3]	Any measurement > DCGL _w ?	EDM/6/1/00	
7.3[4]	Mean > DCGL _w	NA	
7.3[5]	Any measurement > maximum DCGL	NA	
7.4	Evaluation	NA	
7.4[1][D]	New survey package (if req'd)	NA	
7.4[1][E]	Radiological improvement report (if req'd)	NA	
7.4[2]	Verify documentation complete	NA	
8.0	Peer review	EDM/6/13/00	None
	Package submitted to project management	EDM/6/13/00	
9.1	Records to Records Center (copy to project files)	EDM/8-28-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Exterior
Building: T331
Survey Unit Description: Roof and walls of T331

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: S. W. [Signature]

Removable Activity
(dpm/100 cm²) Alpha

0.0
0.3
0.0
0.3
4.5
0.3
0.0
0.3
0.0
0.0
0.3
4.5
1.8
4.5
-1.2
0.0
-1.2
0.0
0.3
1.5
0.3
1.5
0.3
0.0
0.3
12.0
-1.2
0.0
-1.2

Survey Area - N/A
Survey Unit - Exterior
Building - T331
Survey Unit Description - Roof and walls of Trailer T331
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 1.0 dpm/100 cm²
Std Dev 2.7 dpm/100 cm²

No measurement exceeds the DCGL_w

Removable Activity
(dpm/100 cm²) Beta

-12
8
30
-4
-18
12
2
-4
-52
-14
4
-26
12
8
-18
-34
-14
-38
-2
-2
2
-26
-12
2
-18
12
-6
-14

Survey Area - N/A
Survey Unit - Exterior
Building - T331
Survey Unit Description - Roof and walls of Trailer T331
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean -7.9 dpm/100 cm²
Std Dev 17.5 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

30.7
9.3
18.6
-9.3
-12.6
12.1
15.4
-21.4
0
-12.6
-18.6
-2.9
-3.3
40.9
25.2
9.5
-2.9
-6.7
-20.4
-9.5
-25.2
52.3
136.9
81.6
71.4
75.3
81.1
78.2

Survey Area - N/A
Survey Unit - Exterior
Building - T331
Survey Unit Description - Roof and walls of Trailer T331
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 21.2 dpm/100 cm²
Std Dev 41.1 dpm/100 cm²

One measurement exceeds the DCGL_w
Five measurements exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
G-1N	-21.4	19.6	-41	-0.9	4555.556
D-1N	-9.3	9.8	-19.1	0.25	-7640
C-1N	9.3	29.3	-20	19.3	-103.6269
B-1N	30.7	23.0	7.7	26.85	28.67784
C-1E	-25.2	23.0	-48.2	-1.1	4381.818

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta\sigma_s = (100-50)/41.1$
 $\Delta\sigma_s = 1.22$ (default 1.2)
 Sign p = 0.884930
 N = 18.26
 $11.10 * 1.2 = 21.92$
 N = 22

**Total Surface Activity
(dpm/100 cm²) Beta**

-367
-434
177
-324
-261
-307
-57
-40
-441
-377
-434
164
0
37
-13
-67
-30
104
34
54
57
263
-172
162
84
-30
185
219

Survey Area - N/A
Survey Unit - Exterior
Building - T331
Survey Unit Description - Roof and walls of Trailer T331
Total Surface Activity Data Sheet

DCGL_w 5000 dpm/100 cm²
n 28
Mean -64.8 dpm/100 cm²
Std Dev 219.5 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the ~~the~~ DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
G-1N	-40	256	-296	108	-274.0741
D-1N	-324	91	-415	-116.5	356.2232
C-1N	-434	98	-532	-168	0
B-1N	-367	-104	-263	-235.5	111.6773
C-1E	57	51	6	54	11.11111

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/219.5$
 $\Delta/\sigma_s = 11.39$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88 * 1.2 = 13.05$
 N = 14

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>7351</u>
Survey Unit Description <u>2000 + WINGS OF TRUCK 7351</u>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<u>ARCADE PARKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>34.00</u> Date
<u>ROBERT KEENEY</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>34.00</u> Date
<u>PATRICK CHITUMI</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>34.00</u> Date
<u>ARCADE PARKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>37.00</u> Date
<u>PATRICK CHITUMI</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>37.00</u> Date
<u>ROBERT KEENEY</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>38.00</u> Date
<u>[Blank]</u> RCT Printed Name	[REDACTED]	<u>[Blank]</u> RCT Signature	<u>[Blank]</u> Date
<u>[Blank]</u> RCT Printed Name	<u>[Blank]</u> Employee #	<u>[Blank]</u> RCT Signature	<u>[Blank]</u> Date

Quality Control Measurements Performed By

<u>PATRICK CHITUMI</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>37.00</u> Date
<u>PATRICK CHITUMI</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>38.00</u> Date
<u>[Blank]</u> RCT Printed Name	<u>[Blank]</u> Employee #	<u>[Blank]</u> RCT Signature	<u>[Blank]</u> Date
<u>[Blank]</u> RCT Printed Name	<u>[Blank]</u> Employee #	<u>[Blank]</u> RCT Signature	<u>[Blank]</u> Date
<u>[Blank]</u> RCT Printed Name	<u>[Blank]</u> Employee #	<u>[Blank]</u> RCT Signature	<u>[Blank]</u> Date

Survey Reviewed By

<u>Row Warren</u> RCT Foreman Printed Name	[REDACTED]	<u>[Signature]</u> RCT Foreman Signature	<u>06.00</u> Date
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Survey Area: NIA Survey Unit: EXTERIOR Building: ISSA TSSI
 Survey Unit Description: *Room 3 walls of France TSSI.*

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	<i>Socome</i>	<i>Socome</i>	<i>Socome</i>	<i>Socome</i>		
Model	<i>SR4</i>	<i>SR4</i>	<i>SR4</i>	<i>SR4</i>		
Inst. ID #	<i>1</i>	<i>23</i>	<i>32</i>	<i>4</i>	<i>5</i>	<i>6</i>
Serial #	<i>961</i>	<i>1171</i>	<i>80941</i>	<i>80863</i>		
Cal. Due Date	<i>6.21.00</i>	<i>7.11.00</i>	<i>6.27.00</i>	<i>7.12.00</i>		
Analysis Date	<i>3.8.00</i>	<i>3.8.00</i>	<i>3.8.00</i>	<i>3.8.00</i>		<i>3.8</i>
Instrument Bkg 10-min count time	<i>0.5</i>	<i>0.4</i>	<i>40.0</i>	<i>42.5</i>		
Instrument Eff (%)	<i>33</i>	<i>37</i>	<i>25</i>	<i>25</i>		
Instrument MDA 2-min count time <i>dpm</i>	<i>9.6</i>	<i>9.6</i>	<i>69.9</i>	<i>71.9</i>		

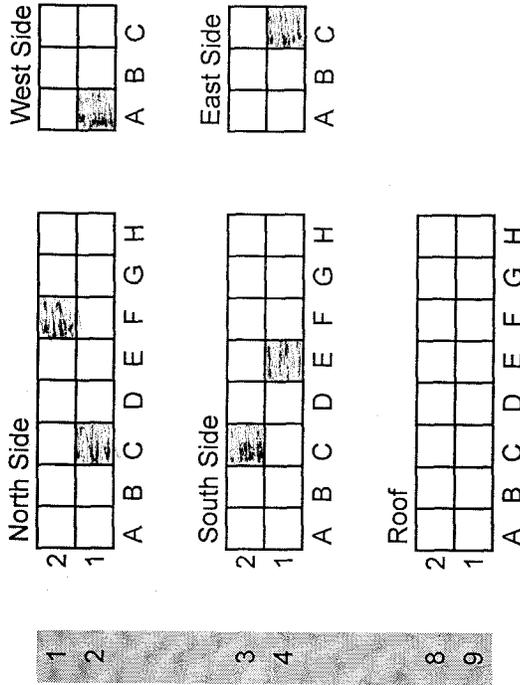
Total Surface Activity Instrument Data

Manufacturer		N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model		Electra		Electra		Electra		<i>NE</i>		<i>NE</i>		<i>NE</i>	
Inst. ID #		<i>7</i>		<i>8</i>		<i>9</i>		<i>10</i>		<i>11</i>		<i>12</i>	
Serial # / Probe #		<i>2385</i>	<i>1931</i>	<i>1315</i>	<i>1308</i>	<i>2376</i>	<i>1921</i>	<i>2378</i>	<i>1936</i>	<i>2376</i>	<i>1921</i>	<i>2376</i>	<i>1921</i>
Cal. Due Date		<i>6.14.00</i>		<i>7.14.00</i>		<i>8.23.00</i>		<i>5.2.00</i>		<i>8.23.00</i>		<i>8.23.00</i>	
Survey Date		<i>3.4.00</i>		<i>3.4.00</i>		<i>3.4.00</i>		<i>3.7.00</i>		<i>3.7.00</i>		<i>3.4.00</i>	
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	<i>1.3</i>	<i>393</i>	<i>2.7</i>	<i>346</i>	<i>3.3</i>	<i>484</i>	<i>2.7</i>	<i>447</i>	<i>3.3</i>	<i>423</i>	<i>2.7</i>	<i>309</i>
Alpha Eff (%)	Beta Eff (%)	<i>21.49</i>	<i>29.94</i>	<i>21.03</i>	<i>21.85</i>	<i>20.46</i>	<i>21.70</i>	<i>22.35</i>	<i>30.34</i>	<i>20.46</i>	<i>21.70</i>	<i>20.46</i>	<i>21.70</i>
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	<i>28.0</i>	<i>250</i>	<i>38.3</i>	<i>212.43</i>	<i>12.6</i>	<i>280</i>	<i>36.0</i>	<i>271</i>	<i>26.9</i>	<i>269</i>	<i>31.3</i>	<i>231</i>

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See Locations:

T331 Exterior

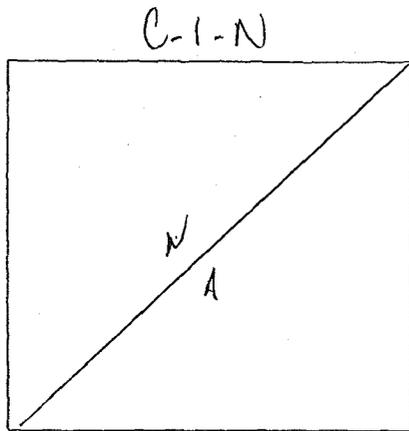


Final Survey NE Electra Scan & Investigation Survey Map

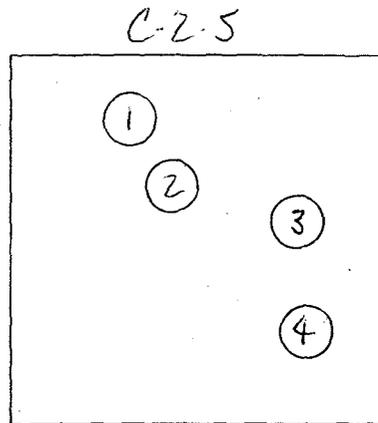
Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T331</u>
Survey Unit Description: <u>Roof - Walls of TRAMWAY T331</u>		
RCT Initials/Date: <u>RF 3/2/00</u>	RCT Initials/Date: <u>N/A</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

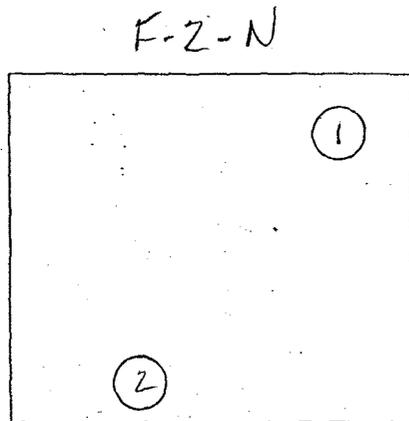
Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor



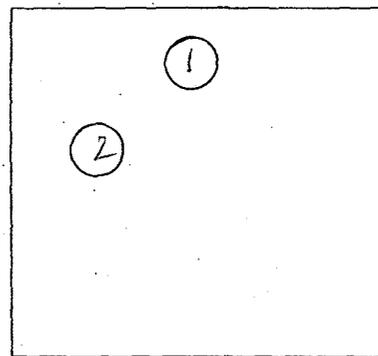
*



*



*



x

* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

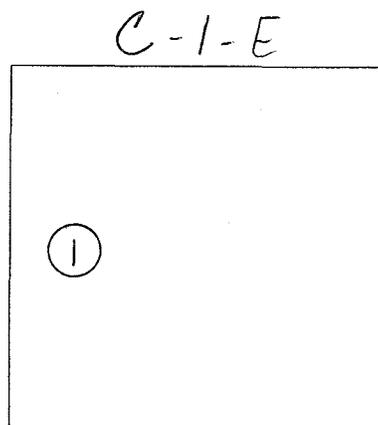
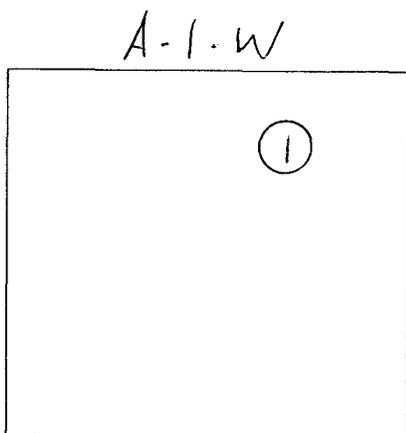
148

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>N/A</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T331</i>
Survey Unit Description: <i>Roof + Walls of TRAILER T331</i>		
RCT Initials/Date: <i>WJ 3/7/00</i>	RCT Initials/Date: <i>VA</i>	RCT Initials/Date: <i>VA</i>

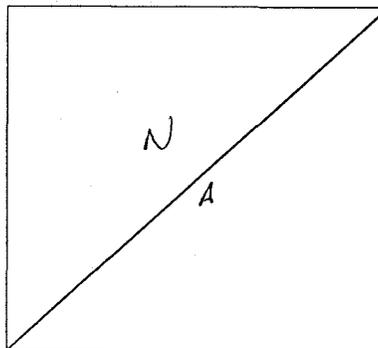
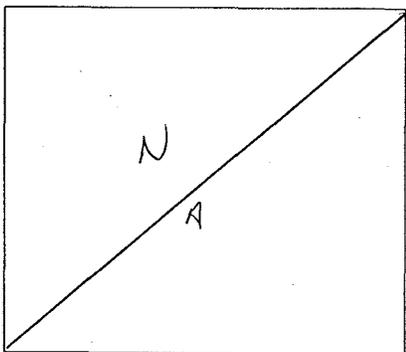
Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R" - Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*

*



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

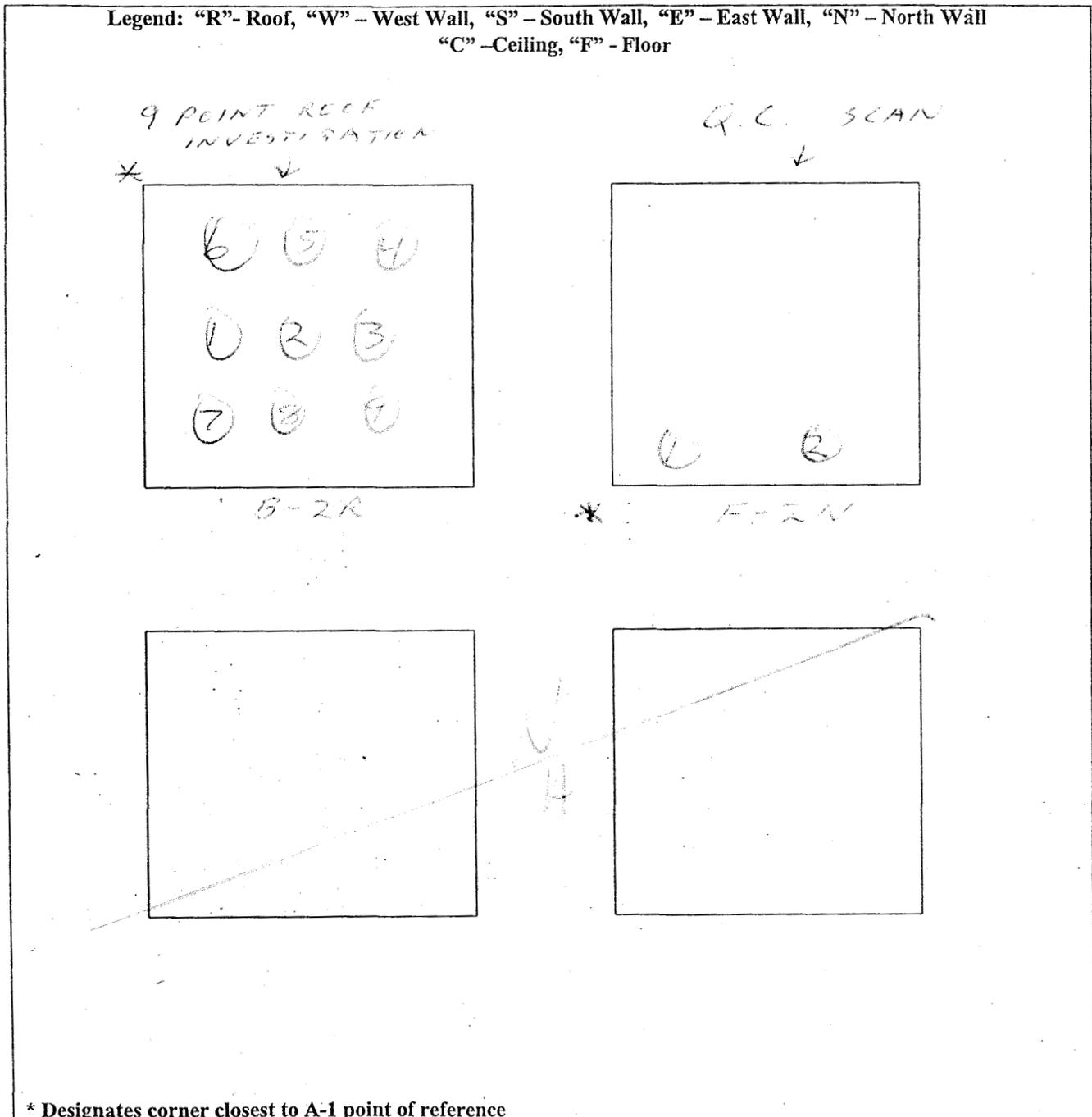
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>7331</u>
Survey Unit Description: <u>9 POINT ROOF INVESTIGATION AND Q.C. SCANS</u>		
RCT Initials/Date: <u>PC 2-7-00</u>	RCT Initials/Date: <u>N/A</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



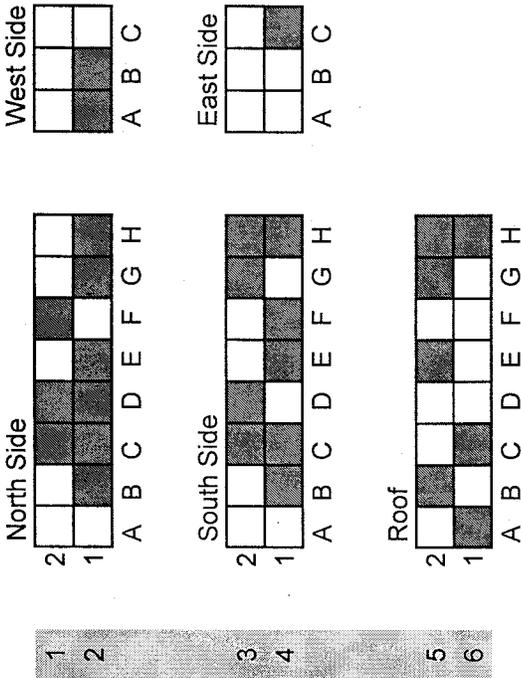
Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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T331 Exterior



1 2 3 4 5 6 7 8 9 10 11

X-Coordinate	Y-Coordinate
10	4

= one square meter
 = direct & swipe

Total Surface Area = 60 m²

10% Scan Surface Area = 6 m²

1	3	6	11	4	1	21	1	6
2	4	2	12	3	2	22	8	2
3	5	2	13	9	2	23	8	4
4	5	5	14	7	2	24	6	4
5	2	4	15	3	4	25	8	3
6	4	3	16	8	6	26	7	3
7	2	5	17	10	2	27	2	2
8	8	5	18	6	1	28	3	3
9	3	1	19	11	4			
10	5	4	20	7	5			

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T331</u>
Survey Unit Description: <u>Part of lines of TRAILOC T331.</u>		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
B-1N		7	7	90	90	8.7	373	7.5	263	6.6	-110	-30.7	-30.7
C-1N		7	7	90	90	4.7	313	6.7	245	2	-130	9.3	-434
C-2N		7	7	90	90	6	233	10	306	4	53	18.6	177
D-1N		7	7	90	90	8.7	306	6.7	269	-2	-97	-9.3	-324
D-2N		7	7	90	90	8.7	300	6	282	-2.7	-78	18.6	-261
E-1N		7	7	90	90	8.7	315	11.3	253	2.6	-92	12.1	-30.7
F-2N		7	7	90	90	6	314	9.3	297	3.3	-17	15.4	-5.7
G-1N		7	7	90	90	9.3	306	4.7	294	-4.6	-12	-21.4	-40
H-1N		7	7	90	90	4	402	4	270	0	-132	0	-441
A-1W		7	7	90	90	8	398	3.3	285	-2.7	-113	-12.6	-377
B-1W		7	7	90	90	6.7	413	2.7	253	-4	-130	-18.6	-434
B-1S		8	8	90	90	9.3	246	8.7	259	-0.6	49	-2.4	164
C-1S		8	8	90	90	10	291	9.3	291	-0.7	0	-3.3	0
C-2S		8	8	90	90	6.7	260	15.3	271	8.6	11	40.9	37
D-2S		8	8	90	90	4.7	277	10	283	5.3	-4	25.2	-13
E-1S		8	8	90	90	6	270	8	236	2	20	9.5	-6.7
F-1S		8	8	90	90	3.3	241	4.7	232	-0.6	-9	-2.4	-30
G-2S		8	8	90	90	8.7	240	7.3	271	-1.4	31	-6.7	104
H-1S		8	8	90	90	11.3	249	6.7	259	-4.3	10	-20.4	34
H-2S		8	8	90	90	12.7	244	10.7	260	-2	16	-9.5	54
C-1E		8	8	90	90	11.3	238	6	235	-3.3	17	-23.2	5.7
A-1R		9	9	90	90	6	351	10.7	437	10.7	78	52.3	263
B-2R		9	9	90	90	4.7	334	32.7	333	28	-51	130.9	-17.2
C-1R		9	9	90	90	2	357	18.7	435	16.7	48	81.6	16.2
E-2R		9	9	90	90	2.7	335	17.3	410	14.6	25	21.4	-5.4
G-2R		9	9	90	90	5.3	413	20.7	404	15.4	-9	75.3	-30
H-1R		9	9	90	90	4.7	378	21.3	433	16.6	55	81.1	185
H-2R		9	9	90	90	4.7	318	20.7	443	16	65	78.2	219
G-1WQC		12	12	90	90	2.7	312	6.7	380	4	76	19.6	256
D-1WQC		12	12	90	90	2.7	1509	4.7	326	2	27	9.8	91
C-1WQC		12	12	90	90	0.7	303	6.7	327	6	29	29.3	95
B-1WQC		12	12	90	90	1.3	313	6	284	4.7	-31	23.0	-104
C-1E QC		12	12	90	90	2.3	314	8	274	4.7	-15	23.0	77

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

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Survey Area: <u>N/A</u>	Survey Unit: <u>EXT 402</u>	Building: <u>T351</u>
Survey Unit Description <u>Rec. in Window of Terrace T351</u>		

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
		B-1W	1	2	0.5	2.1	0	1.3	0
C-1W	3	4	0.5	4.0	0.1	2	0.3	2	
C-2W	1	2	0.5	1.2	0	0.5	0	0	
D-1W	3	4	0.5	4.0	0.1	1	0.3	1	
D-2W	1	2	2	3.2	0.5	2.4	0.5	1.5	
E-1W	3	4	0.5	1.5	0.1	0.3	0.2	1.2	
F-2W	1	2	0.5	1.0	0	0.5	0	0	
G-1W	3	4	0.5	4.0	0.5	1	0.3	1	
H-1W	1	2	0.5	0.1	0	0.3	0	0.2	
A-1W	3	4	0.5	3.1	0.1	2.5	0.3	1.4	
B-1W	1	2	2	4.1	1.5	1	1.5	1	
B-1S	3	4	1	3.0	0.6	2.4	1.8	2.0	
C-1S	1	2	2	9.3	0.8	8	7.5	1.2	
C-2S	3	4	0	4.0	0.1	2	1.2	0	
D-2S	1	2	0.5	2.5	0	1.5	0	1.5	
E-1S	3	4	0	3.4	0.5	2.5	1.2	3.4	
F-1S	1	2	0.5	3.0	0	2.5	0	1.4	
G-2S	3	4	0.5	3.9	0.1	3.4	0.5	3.3	
H-1S	1	2	1	3.5	0.5	0.5	1.5	2	
H-2S	3	4	0.5	4.2	0.1	0.5	0.3	2	
C-1E	1	2	1	4.0	0.5	0.5	1.5	2	
A-1R	3	4	0.5	1	0.1	0.5	0.3	0.2	
B-2R	1	2	0.5	3.1	0	0.3	0	1.2	
C-1R	3	4	0.5	4.3	0.1	0.5	0.3	2	
E-2R	1	2	4.5	3.5	3.0	1.5	12.2	1.8	
G-2R	3	4	0	1.5	0.1	0.3	1.2	1.2	
H-1R	1	2	0.5	3.5	0	1.5	0	0	
H-2R	3	4	0	3.1	0.1	0.3	1.2	1.4	

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Survey Area: <i>N/A</i>	Survey Unit: <i>[Redacted]</i>	Building: <i>7231</i>
Survey Unit Description: <i>Rock Sample Location</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>MAICK LAWSON</i>	[Redacted]	<i>[Signature]</i>	<i>3-28-00</i>
RCT Printed Name		RCT Signature	Date
<i>Tom Bincham</i>	[Redacted]	<i>[Signature]</i>	<i>3-28-00</i>
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee # <i>N</i>	RCT Signature	Date
RCT Printed Name	Employee # <i>A</i>	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee # <i>N</i>	RCT Signature	Date
RCT Printed Name	Employee # <i>A</i>	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<i>SCERNAN</i>	[Redacted]	<i>[Signature]</i>	<i>3-29-00</i>
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: NA	Survey Unit: Exterior	Building: T331
Survey Unit Description Roof Sample Location		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE	EBERLINE	EBERLINE		
Model	SAC4	BC4	SAC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	823	966	1171	868		
Cal. Due Date	9/6/00	9/15/00	7/11/00	7/12/00		
Analysis Date	3/29/00	3/29/00	3/29/00	3/29/00		
Instrument Bkg. ^{cpm} 10-min count time	0.5	38.1	0.6	38.8		
Instrument Eff (%)	33	25	33	25		
Instrument MDA ^{dpm} 2-min count time	9.6	68.3	10.1	68.9	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		N.E. Tech.			
Model	Electra		Electra		Electra		Electra			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	2374	1919	2376	1921						
Cal. Due Date	9/8/00		8/23/00							
Survey Date	3/28/00		3/28/00							
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90 sec count time ^{cpm}									
	4.7	406	3.3	407						
Alpha Eff (%)	Beta Eff (%)									
	20.85	29.89	20.46	29.7						
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time									
	48.2	262	42.6	264	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

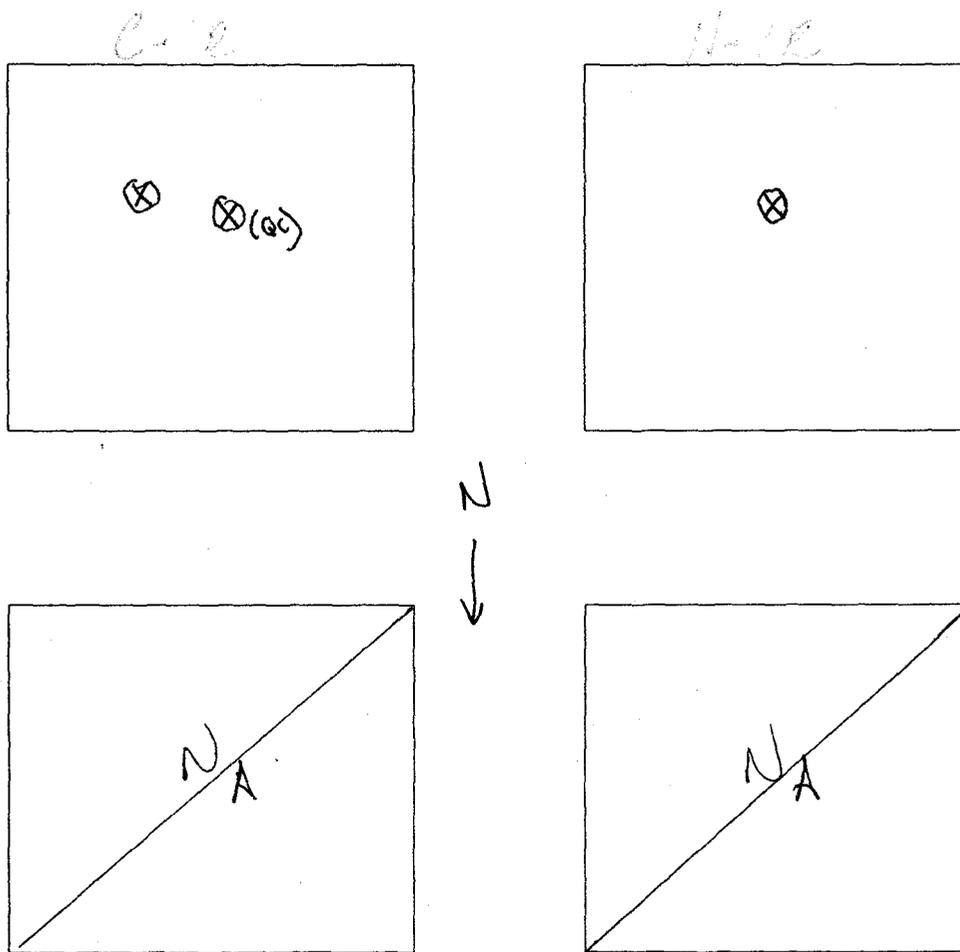
157

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>N/A</i>	Survey Unit: <i>Surrounding</i>	Building: <i>T331</i>
Survey Unit Description: <i>Roof Sample Locations</i>		
RCT Initials/Date: <i>NA 3/23/00</i>	RCT Initials/Date: <i>NA</i>	RCT Initials/Date: <i>NA</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" – West Wall, "S" – South Wall, "E" – East Wall, "N" – North Wall
"C" –Ceiling, "F" - Floor**



⊗ SAMPLE CUT OUT

* Designates corner closest to A-I point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T750E	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.			
Building Information: Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/> Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/> Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls: Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS		<i>[Signature]</i>	
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS		<i>[Signature]</i>	
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS		<i>[Signature]</i>	
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS		<i>[Signature]</i>	
RESS Manager Printed Name		RESS Manager Signature	Date

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T750E		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior		Area (m ²): 126	
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T750E
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	INTERIOR FLOORS/WALLS/CEILINGS: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4
	<u>QUALITY ASSURANCE SURVEYS</u>	SEE NOTE 5 SEE NOTE 6
	INTERIOR FLOORS/WALLS/CEILINGS: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T750E
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning <i>Change #2 EPM 1/2/00</i>	<p>INTERIOR FLOORS: Biased surface scans will be performed on the interior floors in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring.</p> <p>No more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u> INTERIOR FLOORS: 5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicron/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T750E		
Survey Area: Not Applicable	Survey Unit: Interior		
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.			
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> <p>$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$</p> <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS		<i>[Signature]</i>	2/12/00
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS		<i>[Signature]</i>	2/1/00
RESS RE Printed Name		RESS RE Signature	Date

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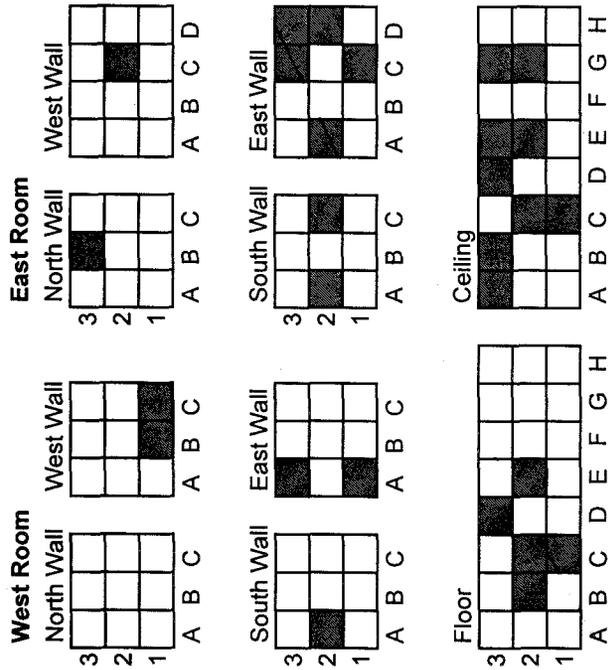
3-164

SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.	
Floor Area (m²): 24	Total Area (m²): 126
SEE ATTACHED SURVEY MAP	

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T750E Interior



Handwritten notes:
 100% Swipes
 100% Swipes

X-Coordinate	Y-Coordinate
16	5

☐ = one square meter
 ■ = direct & swipe

Total Surface Area = 126 m²

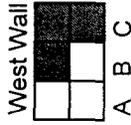
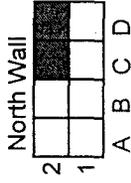
10% Scan Surface Area = 13 m²

1	9	7	11	3	9	21	15	4
2	5	8	12	15	8	22	12	7
3	5	6	13	11	9	23	15	2
4	15	6	14	10	1	24	3	8
5	2	8	15	15	7	25	4	7
6	13	5	16	16	4	26	1	5
7	13	7	17	11	5	27	11	8
8	7	3	18	16	5	28	13	8
9	9	5	19	10	7			
10	6	3	20	5	4			

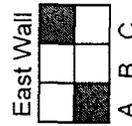
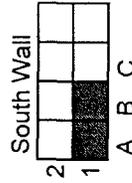
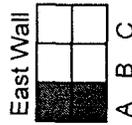
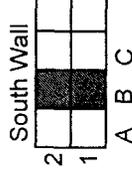
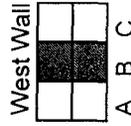
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T750E Interior

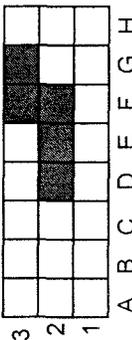
West Room



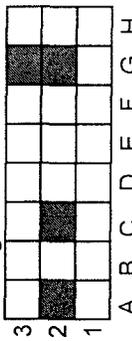
East Room



Floor



Ceiling



- 1
- 2
- 3
- 4
- 5
- 6
- 7

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

X-Coordinate	Y-Coordinate
16	4

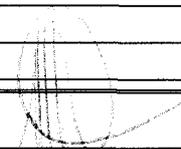
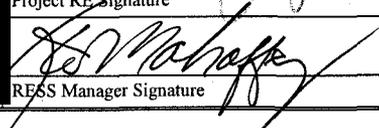
= one square meter
 = direct & swipe

Total Surface Area = 104 m²

10% Scan Surface Area = 10.4 m²

1	16	3	11	9	2	21	15	5
2	9	1	12	8	1	22	10	2
3	2	4	13	10	4	23	9	4
4	14	4	14	8	2	24	4	6
5	3	1	15	11	2	25	6	6
6	9	6	16	6	3	26	15	1
7	15	2	17	5	6	27	4	1
8	6	4	18	11	6	28	7	5
9	7	1	19	2	3			
10	15	6	20	6	5			

SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: T750E	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion	RCT Supervisor	PRE	
Scan Surveys	✓	EDM	
Total Activity Surveys	✓	EDM	
Exposure Rate Surveys	NA	NA	
Removable Surveys	✓	EDM	
Media Samples	NA	NA	
Volumetric Samples	NA	NA	
All Surveys and Samples Accounted For	RCT Supervisor	PRE	
Scan Surveys	✓	EDM	
Total Activity Surveys	✓	EDM	
Exposure Rate Surveys	NA	NA	
Removable Surveys	✓	EDM	
Media Samples	NA	NA	
Volumetric Samples	NA	NA	
Comments:			
Rick Roberts RCT Supervisor Printed Name		 RCT Supervisor Signature	6-12-00 Date
Rick Roberts Project RE Printed Name		S. W. [Signature] Project RE Signature	6-12-00 Date
H. B. ESTABROOKS RESS Manager Printed Name		 RESS Manager Signature	8-14-00 Date

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(09/30/99)

APPENDIX A

Page 1 of 1

DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KRM / 6/1/00	
7.1[1]	DQOs implemented as prescribed	KRM / 6/1/00	
7.1[2]	All required supporting documents present	KRM / 6/1/00	
7.1[3]	Outliers / anomalies addressed	KRM / 6/1/00	
7.2	Data Validation	KRM / 6/1/00	
7.2.1	Survey/Sample Precision	KRM / 6/1/00	see spreadsheets
7.2.2	Survey Accuracy	KRM / 6/1/00	
	Sample Accuracy	KRM / 6/1/00	
7.2.3	Data Representative of survey unit	KRM / 6/1/00	yes
7.2.4	Survey/Sample/Scan Completeness	KRM / 6/1/00	100%
7.2.5	Data Comparable to related units	KRM / 6/1/00	yes, Group B
7.3	DQA complete	KRM / 6/1/00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	NA	
7.3[4]	Mean > DCGL _w	NA	
7.3.[5]	Any measurement > maximum DCGL	NA	
7.4	Evaluation	NA	
7.4[1][D]	New survey package (if req'd)	NA	
7.4[1][E]	Radiological improvement report (if req'd)	NA	
7.4[2]	Verify documentation complete	NA	
8.0	Peer review	6/13/00	None
	Package submitted to project management	6/13/00	
9.1	Records to Records Center (copy to project files)	EDM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

**Removable Activity
(dpm/100 cm²) Alpha**

Survey Area - N/A
 Survey Unit - Interior
 Building - T750E
 Survey Unit Description - Walls, ceiling and floor of Trailer T750E
 Removable Contamination Data Sheet
 DCGL_w 20 dpm/100 cm²
 n 28
 Mean 0.0 dpm/100 cm²
 Std Dev 1.4 dpm/100 cm²

No measurement exceeds the DCGL_w

- 1.5
- 1.2
- 1.5
- 3.3
- 1.5
- 1.8
- 1.5
- 1.8
- 1.5
- 1.2
- 0.0
- 1.2
- 0.0
- 0.3
- 0.0
- 1.2
- 1.5
- 1.2
- 1.5
- 0.3
- 1.5
- 0.3
- 1.5
- 1.8
- 1.5
- 0.3
- 1.5
- 0.3

Removable Activity
(dpm/100 cm²) Beta

10
-24
4
14
24
-24
-30
-14
-6
22
-8
-18
8
-14
-2
28
-14
6
44
-6
-4
-18
-30
0
6
0
-6
12

Survey Area - N/A
Survey Unit - Interior
Building - T750E
Survey Unit Description - Walls, ceiling and floor of Trailer T750E
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean -1.4 dpm/100 cm²
Std Dev 17.9 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

8.9
0
8.9
2.7
0
5.8
11.6
12.1
3.1
26.8
6.3
3.1
8.9
8.9
-2.7
-2.7
2.7
11.6
5.8
3.1
17.9
15.2
-5.8
2.7
3.1
6.3
8.9
5.8

Survey Area - N/A
Survey Unit - Interior
Building - T750E
Survey Unit Description - Walls, ceiling and floor of Trailer T750E
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 6.4 dpm/100 cm²
Std Dev 6.7 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
C-2N	8.9	15.8	-6.9	12.35	-55.87045
C-1W	2.7	9.6	-6.9	6.15	-112.1951
B-1S	5.8	2.9	2.9	4.35	66.66667
B-1W	8.9	15.8	-6.9	12.35	-55.87045
B-1S	2.7	6.7	-4	4.7	-85.10638

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/6.7$
 $\Delta/\sigma_s = 7.46$ (default 3.0)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

**Total Surface Activity
(dpm/100 cm²) Beta**

-319
-362
-234
-194
-191
-283
-319
-323
-277
7
-293
-23
-168
-287
-329
-264
-13
-273
-221
105
46
-53
362
49
-53
-92
217
102

Survey Area - N/A
Survey Unit - Interior
Building - T750E
Survey Unit Description - Walls, ceiling and floor of Trailer T750E
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean -131.5 dpm/100 cm²
Std Dev 188.2 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
C-2N	-319	-206	-113	-262.5	43.04762
C-1W	-194	-275	81	-234.5	-34.54158
B-1S	-283	-244	-39	-263.5	14.80076
B-1W	-287	-10	-277	-148.5	186.532
B-1S	-13	-230	217	-121.5	-178.6008

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/188.2$
 $\Delta/\sigma_s = 13.28$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

Survey Area: N/A	Survey Unit: [REDACTED]	Building: 1750
Survey Unit Description [REDACTED]		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

ROBERT KELLEY	[REDACTED]	[Signature]	3-6-00
RCT Printed Name		RCT Signature	Date
ROBERT KELLEY	[REDACTED]	[Signature]	3-8-00
RCT Printed Name		RCT Signature	Date
MARK LAWSON	[REDACTED]	[Signature]	3-10-00
RCT Printed Name		RCT Signature	Date
ROBERT KELLEY	[REDACTED]	[Signature]	3-10-00
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

MARK LAWSON	[REDACTED]	[Signature]	3-10-00
RCT Printed Name		RCT Signature	Date
ARCHIE PARKER	[REDACTED]	[Signature]	3-10-00
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Ken Warsta	[REDACTED]	[Signature]	3-13-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

Survey Area: N/A	Survey Unit: INTERIOR	Building: 9750E
Survey Unit Description Room 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBEONE	EBEONE	EBEONE	EBEONE		
Model	SR-4	SR-4	SR-4	SR-4		
Inst. ID #	1	2	3	4	5	6
Serial #	961	101	20501	20100		
Cal. Due Date	6-21-00	7-11-00	8-21-00	7-11-00		
Analysis Date	3-8-00	3-8-00	3-8-00	3-8-00		
Instrument Bkgcpm 10-min count time	0.5	0.4	40.6	42.5		
Instrument Eff (%)	33	33	25	25		
Instrument MDA 2-min count time dpm	9.6	9.0	69.9	71.9		

Total Surface Activity Instrument Data

Manufacturer		N.E. Tech.		N.E. Tech.		N.E. Tech.		NO			
Model		Electra		Electra		Electra		ELECTRA			
Inst. ID #		7		8		9		10		11	12
Serial # / Probe #		2578	1926	1915	1921	2576	1921	2575	1926		
Cal. Due Date		5-3-00		7-11-00		5-23-00		5-3-00			
Survey Date		3-6-00		3-10-00		3-10-00		3-10-00			
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	1.3	321	2	366	1.3	368	0	361		
Alpha Eff (%)	Beta Eff (%)	20.35	30.36	20.84	20.08	20.16	29.70	22.35	30.36		
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	27.5	230	34.4	260	30.0	258	8.1	244		

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325-02

See locations:

T750E Interior

West Room

North Wall

2				
1				
	A	B	C	D

West Wall

	A	B	C	

South Wall

2				
1				
	A	B	C	

East Wall

	A	B	C	

East Room

North Wall

2				
1				
	A	B	C	D

West Wall

	A	B	C	

South Wall

2				
1				
	A	B	C	

East Wall

	A	B	C	

Floor

3									
2									
1									
	A	B	C	D	E	F	G	H	

Ceiling

3									
2									
1									
	A	B	C	D	E	F	G	H	

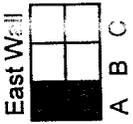
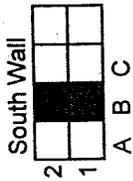
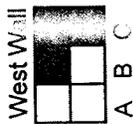
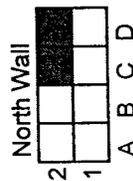


SURVEY PACKAGE SURVEY UNIT
 Revision 1

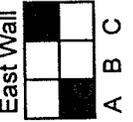
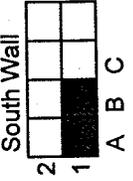
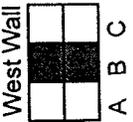
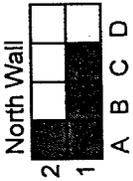
Package ID: 2000-01
 Building: T750E
 Survey Unit: Interior

T750E Interior

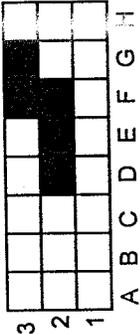
West Room



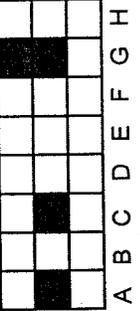
East Room



Floor



Ceiling



X Coordinate	Y Coordinate
16	4

□ = one square meter
 ■ = direct & swipe

Total Surface Area = 104 m²
 10% Scan Surface Area = 10.4 m²

1	16	3	11	9	2	21	15	5
2	9	1	12	8	1	22	10	2
3	2	4	13	10	4	23	9	4
4	14	4	14	8	2	24	4	6
5	3	1	15	11	2	25	6	6
6	9	6	16	6	3	26	15	1
7	15	2	17	5	6	27	4	1
8	6	4	18	11	6	28	7	5
9	7	1	19	2	3			
10	15	6	20	6	5			

5 OF 8

Survey Area: 11A Survey Unit: 100000 Building: 17500
 Survey Unit Description: Exposure 17500 + GC. Counts for 17500.

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (cpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
WEST				90	90								
C-2W		7	7	90	90	1.3	555	3.3	261	2	-97	3.9	-319
D-2W		7	7	90	90	1.3	347	2.0	237	0	-110	0	-362
B-2W		7	7	90	90	0	552	2	261	2	-11	3.9	-234
C-1W		7	7	90	90	2.7	523	3.3	266	0.6	-39	2.7	-194
C-2W		7	7	90	90	2	519	2	261	0	-58	0	-191
B-1S		7	7	90	90	2	547	3.3	261	1.3	-56	5.8	-283
B-2S		7	7	90	90	0.7	346	3.3	249	2.6	-97	11.6	-319
A-1E		7	7	90	90	4	553	6.7	235	2.7	-90	12.1	-323
A-2E		7	7	90	90	2	537	2.7	253	0.7	-84	3.1	-277
EAST				90	90								
A-1W		7	7	90	90	0	543	6	265	6	2	26.3	7
A-2W		7	7	90	90	3.3	538	4.7	249	1.4	-89	6.3	-243
B-1W		7	7	90	90	2	555	2.7	248	6.7	-7	3.1	-23
C-1W		7	7	90	90	2	511	4	260	3	-51	3.9	-278
B-1W		7	7	90	90	3.3	334	3.3	247	2	-87	3.9	-287
B-2W		7	7	90	90	3.3	552	2.7	252	-0.6	-100	-2.7	-329
A-1S		7	7	90	90	1.3	540	0.7	260	-0.6	-86	-2.7	-264
B-1S		7	7	90	90	0.7	250	1.3	210	0.6	-4	2.7	-13
A-1E		7	7	90	90	2.7	336	3.3	253	2.0	-53	11.6	-273
C-2E		7	7	90	90	0.7	534	2	261	1.3	-67	5.8	-221
				90	90								
				90	90								
				90	90								
				90	90								
				90	90								
				90	90								
				90	90								
West Room				90	90								
C-2WQC		8	8	90	90	0.7	367	4	363	3.3	-59	15.8	-266
C-1WQC		8	8	90	90	2	546	4	267	2	-19	9.6	-273
B-1SQC		8	8	90	90	2.7	366	3.3	246	0.6	-70	2.9	-244
EAST Room				90	90								
B-1WQC		8	8	90	90	2.7	333	6	309	3.3	-3	15.8	-10
B-1SQC		8	8	90	90	1.3	366	2.7	360	1.4	-66	6.7	-230

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

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N

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T750E																				
Survey Area: Not Applicable		Survey Unit: Exterior																				
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.																						
Building Information:																						
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>																						
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>																						
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>																						
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/>																						
Justification for Classification: This facility has no known history of radiological contamination.																						
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.																						
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.																						
Isolation Controls:																						
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>																						
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.																						
Survey Package Implementation:																						
<table border="1"> <tr> <td>RICK ROBERTS</td> <td rowspan="6">[Redacted]</td> <td><i>[Signature]</i></td> <td>2/2/00</td> </tr> <tr> <td>Radiological Engineer Printed Name</td> <td>Radiological Engineer Signature</td> <td>Date</td> </tr> <tr> <td>NOT APPLICABLE</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>REFS Manager Printed Name</td> <td>REFS Manager Signature</td> <td>Date</td> </tr> <tr> <td>H. B. ESTABROOKS</td> <td><i>[Signature]</i></td> <td>2/2/00</td> </tr> <tr> <td>RESS Manager Printed Name</td> <td>RESS Manager Signature</td> <td>Date</td> </tr> </table>				RICK ROBERTS	[Redacted]	<i>[Signature]</i>	2/2/00	Radiological Engineer Printed Name	Radiological Engineer Signature	Date	NOT APPLICABLE	N/A	N/A	REFS Manager Printed Name	REFS Manager Signature	Date	H. B. ESTABROOKS	<i>[Signature]</i>	2/2/00	RESS Manager Printed Name	RESS Manager Signature	Date
RICK ROBERTS	[Redacted]	<i>[Signature]</i>	2/2/00																			
Radiological Engineer Printed Name		Radiological Engineer Signature	Date																			
NOT APPLICABLE		N/A	N/A																			
REFS Manager Printed Name		REFS Manager Signature	Date																			
H. B. ESTABROOKS		<i>[Signature]</i>	2/2/00																			
RESS Manager Printed Name		RESS Manager Signature	Date																			
Survey Package Closure:																						
<table border="1"> <tr> <td>RICK ROBERTS ^{EM 1/10/00} <i>[Signature]</i></td> <td rowspan="6">[Redacted]</td> <td><i>[Signature]</i></td> <td>2/2/00</td> </tr> <tr> <td>RESS Radiological Engineer Printed Name</td> <td>RESS Radiological Engineer Signature</td> <td>Date</td> </tr> <tr> <td>NOT APPLICABLE</td> <td>N/A</td> <td>N/A</td> </tr> <tr> <td>REFS Manager Printed Name</td> <td>REFS Manager Signature</td> <td>Date</td> </tr> <tr> <td>H. B. ESTABROOKS ^{EM 8/14/00} <i>[Signature]</i></td> <td><i>[Signature]</i></td> <td>8-14-00</td> </tr> <tr> <td>RESS Manager Printed Name</td> <td>RESS Manager Signature</td> <td>Date</td> </tr> </table>				RICK ROBERTS ^{EM 1/10/00} <i>[Signature]</i>	[Redacted]	<i>[Signature]</i>	2/2/00	RESS Radiological Engineer Printed Name	RESS Radiological Engineer Signature	Date	NOT APPLICABLE	N/A	N/A	REFS Manager Printed Name	REFS Manager Signature	Date	H. B. ESTABROOKS ^{EM 8/14/00} <i>[Signature]</i>	<i>[Signature]</i>	8-14-00	RESS Manager Printed Name	RESS Manager Signature	Date
RICK ROBERTS ^{EM 1/10/00} <i>[Signature]</i>	[Redacted]	<i>[Signature]</i>	2/2/00																			
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date																			
NOT APPLICABLE		N/A	N/A																			
REFS Manager Printed Name		REFS Manager Signature	Date																			
H. B. ESTABROOKS ^{EM 8/14/00} <i>[Signature]</i>		<i>[Signature]</i>	8-14-00																			
RESS Manager Printed Name		RESS Manager Signature	Date																			

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: T750E	
Survey Area: Not Applicable		Survey Unit: Exterior	
Change #	Description	Initiator/ Date	PRE
1	a) Incorporate requirements of Letter RSE-003-00, dated 2/12/00 (See p. 242.2)	EDM 3/15/00	✓
	b) Incorporate requirements of Letter RSE-003-00, dated 2/12/00 (See p. 242.2)		
	c) Incorporate provision to survey map. Specify water delineated from 2000 delineation 7'0.00 meters.		
	d) Size of scan sample shall be as the map.		
2	Perform roof survey/sampling per Letter RSE-003-00 dated 3/19/00 (See p. 8h of 242)	EDM 3/15/00	✓
3	2 samples + 1 QC sample required per Characterization Package Supplement for Sampling and Analysis of Roofing Material from Groups B+C for isotopic analysis	EDM 4/1/00	✓
4	Roof survey/sampling performed per Letter EDM-003-00	EDM 6/7/00	✓
5	Corrected scan requirement	EDM 7/11/00	✓

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T750E		Type: 1	
Survey Area: Not Applicable		Survey Unit: Exterior		Area (m ²): 90	
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	EM 100 4/10 2	0	Biased
Building:		Type: Change # 3 EM 4/1/00		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T750E
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	EXTERIOR WALLS/ROOF: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4
	<u>QUALITY ASSURANCE SURVEYS</u>	SEE NOTE 5 SEE NOTE 6
	EXTERIOR WALLS/ROOF: 5 surveys will be taken per direction from radiological engineering.	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T750E
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning <i>Change #5 EJM 7-11-00</i>	<p>EXTERIOR WALLS/ROOF:</p> <p>Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p><i>less</i> No more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>EXTERIOR WALLS/ROOF:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicron/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 20'X 10' restroom facility. Its present condition is very poor.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01		Building: T750E	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.			
<input checked="" type="checkbox"/> Total Surface Activity		<input type="checkbox"/> Media Surface Activity	
<input checked="" type="checkbox"/> Removable Surface Activity		<input type="checkbox"/> Volumetric Surface Activity	
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS			
Project RE Printed Name			
H.B. ESTABROOKS			
RESS RE Printed Name			

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SURVEY PACKAGE SURVEY MAP

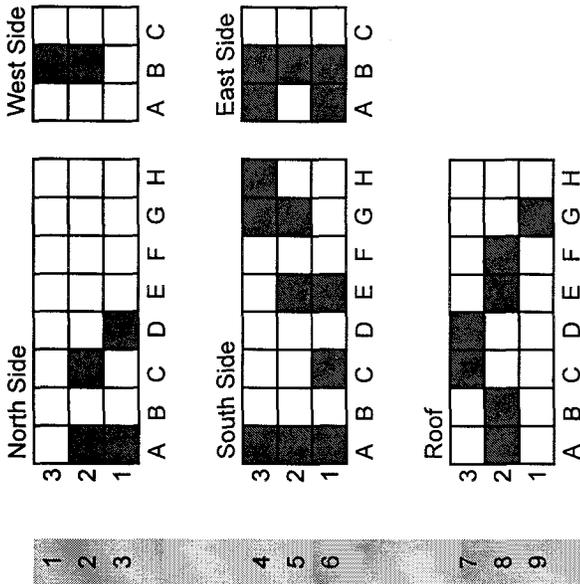
Package ID: 2000-01	Building: T750E
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer is a 20' X 10' restroom facility. Its present condition is very poor.	
Floor Area (m²): 24	Total Area (m²): 90
SEE ATTACHED SURVEY MAP	

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T750E Exterior



1 2 3 4 5 6 7 8 9 10 11

X-Coordinate	Y-Coordinate
9	4

□ = one square meter
 ■ = direct & swipe

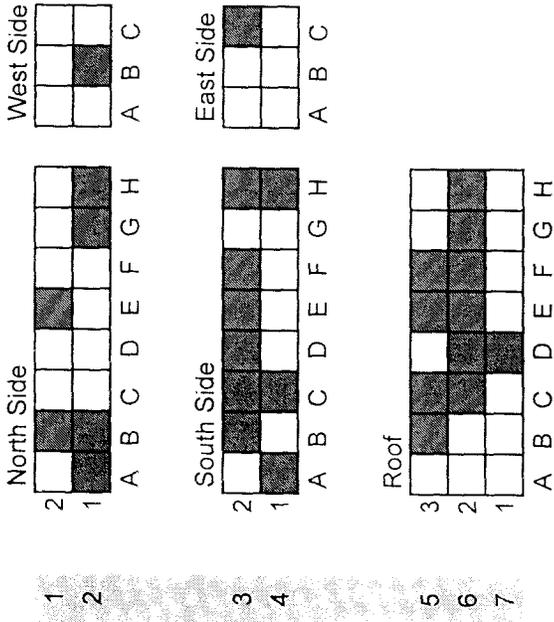
Total Surface Area = 90 m²

10% Scan Surface Area = 9 m²

X	Y	X	Y	X	Y
1	2	11	10	21	5
2	1	12	10	22	1
3	4	13	8	23	4
4	10	14	1	24	5
5	7	15	3	25	6
6	7	16	3	26	3
7	3	17	9	27	10
8	9	18	7	28	10
9	1	19	4		
10	5	20	1		

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T750E Exterior



1 2 3 4 5 6 7 8 9 10 11

X-Coordinate	Y-Coordinate
5	2

= one square meter
 = direct & swipe

Total Surface Area = 68 m²
 10% Scan Surface Area = 6.8 m²

X	Y	X	Y	X	Y			
1	3	5	11	1	4	21	7	2
2	5	3	12	2	1	22	8	4
3	5	5	13	3	3	23	4	6
4	8	3	14	2	2	24	10	2
5	5	1	15	8	6	25	4	3
6	6	3	16	11	3	26	4	7
7	3	4	17	8	2	27	1	2
8	6	6	18	2	5	28	2	3
9	6	5	19	7	6			
10	5	6	20	3	6			

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SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: T750E	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion		RCT Supervisor	PRE
Scan Surveys		✓	KDM
Total Activity Surveys		✓	KDM
Exposure Rate Surveys		NA	NA
Removable Surveys		✓	KDM
Media Samples		✓	KDM
Volumetric Samples		NA	NA
All Surveys and Samples Accounted For		RCT Supervisor	PRE
Scan Surveys		✓	KDM
Total Activity Surveys		✓	KDM
Exposure Rate Surveys		NA	NA
Removable Surveys		✓	KDM
Media Samples		✓	KDM
Volumetric Samples		NA	NA
Comments:			
RICK ROBERTS ERIC D. McKAMEY		[Redacted Signature]	
Project RE Printed Name		Project RE Signature	
H. B. ESTABROOKS J. W. Mahaffey		[Redacted Signature]	
RESS Manager Printed Name		RESS Manager Signature	
		Date	
		6-12-00	
		Date	
		8-14-00	
		Date	

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	EDM / 6/1/00	
7.1[1]	DQOs implemented as prescribed	EDM / 6/1/00	
7.1[2]	All required supporting documents present	EDM / 6/1/00	
7.1[3]	Outliers / anomalies addressed	EDM / 6/1/00	
7.2	Data Validation	EDM / 6/1/00	
7.2.1	Survey/Sample Precision	EDM / 6/1/00	see spreadsheets
7.2.2	Survey Accuracy	EDM / 6/1/00	
	Sample Accuracy	EDM / 6/1/00	
7.2.3	Data Representative of survey unit	EDM / 6/1/00	yes
7.2.4	Survey/Sample/Scan Completeness	EDM / 6/1/00	100%
7.2.5	Data Comparable to related units	EDM / 6/1/00	yes, Group B
7.3	DQA complete	EDM / 6/1/00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	EDM / 6/1/00	
7.3[4]	Mean > DCGL _w	NA	
7.3[5]	Any measurement > maximum DCGL	NA	
7.4	Evaluation	NA	
7.4[1][D]	New survey package (if req'd)	NA	
7.4[1][E]	Radiological improvement report (if req'd)	NA	
7.4[2]	Verify documentation complete	NA	
8.0	Peer review	ds 6/13/00	None
	Package submitted to project management	EDM / 6/1/00	
9.1	Records to Records Center (copy to project files)	EDM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Exterior
Building: T750E
Survey Unit Description: Roof and walls of T750E

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. A. [Signature] 6/1/00

Removable Activity
(dpm/100 cm²) Alpha

Survey Area - N/A
Survey Unit - Exterior
Building - T750E
Survey Unit Description - Roof and walls of Trailer T750E
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 1.0 dpm/100 cm²
Std Dev 1.9 dpm/100 cm²

No measurement exceeds the DCGL_w

- 0.0
- 0.3
- 1.5
- 1.8
- 4.5
- 1.2
- 1.5
- 0.3
- 3.0
- 3.3
- 0.0
- 1.2
- 1.5
- 1.2
- 0.0
- 3.3
- 0.0
- 1.2
- 1.5
- 1.2
- 0.0
- 0.3
- 3.0
- 1.8
- 4.5
- 4.8
- 0.0
- 0.3

**Removable Activity
(dpm/100 cm²) Beta**

Survey Area - N/A
 Survey Unit - Exterior
 Building - T750E
 Survey Unit Description - Roof and walls of Trailer T750E
 Removable Contamination Data Sheet
 DCGL_w 1000 dpm/100 cm²
 n 28
 Mean -7.7 dpm/100 cm²
 Std Dev 17.4 dpm/100 cm²

No measurement exceeds the DCGL_w

- 32
- 4
- 18
- 2
- 10
- 2
- 24
- 6
- 14
- 18
- 2
- 24
- 22
- 12
- 20
- 34
- 0
- 24
- 4
- 14
- 2
- 14
- 36
- 28
- 34
- 10
- 2
- 12

**Total Surface Activity
(dpm/100 cm²) Alpha**

34
52.6
25.1
12.6
34.0
24.7
61.9
53.5
15.7
-15.7
25.2
-31.4
-12.4
22.3
56.3
68.5
25.4
3.1
5.8
117.3
227.8
179.4
178.9
169.1
162.8
254.2
211.6
130.5

Survey Area - N/A
Survey Unit - Exterior
Building - T903A
Survey Unit Description - Roof and walls of Trailer T903A
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 74.7 dpm/100 cm²
Std Dev 81.5 dpm/100 cm²

9 measurements exceeds the DCGL_w
9 measurements exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
C-1E	3.1	0	3.1	1.55	200
J-2S	22.3	32.7	-10.4	27.5	-37.81818
I-2S	-12.4	23.0	-35.4	5.3	-667.9245
A-2E	68.5	29.3	39.2	48.9	80.1636
F-1S	25.2	48.9	-23.7	37.05	-63.96761

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/81.5$
 $\Delta/\sigma_s = 0.61$ (default 0.60)
 Sign p = 0.725747
 N = 53.10
 $53.10 * 1.2 = 63.72$
 N = 64

Note: Where TSA results are elevated due to Po-210 concentrations, the Post Survey calculations can indicate that more survey points are needed. These numbers are artificially high because the elevated results are due to Po-210, and not due to DOE-added radionuclides. Consequently, where the presence of NORM (specifically Po-210) is confirmed through alpha spec analysis, Post Survey Statistics Calculations that use survey (TSA) results are not applicable as a means of checking TSA survey frequencies. Adequate survey frequency would be indicated if results attained from analytical samples were used instead.

**Total Surface Activity
(dpm/100 cm²) Beta**

Survey Area - N/A
 Survey Unit - Exterior
 Building - T750E
 Survey Unit Description - Roof and walls of Trailer T750E
 Total Surface Activity Data Sheet

DCGL_w 5000 dpm/100 cm²
 n 28
 Mean -27.8 dpm/100 cm²
 Std Dev 143.8 dpm/100 cm²

No measurement exceeds the DCGL_w
 No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
G-1N	-60	-111	51	-85.5	-59.64912
B-1W	-454	-192	-262	-323	81.11455
A-1S	74	-141	215	-33.5	-641.791
C-1S	-20	-414	394	-217	-181.5668
H-1S	-30	-51	21	-40.5	-51.85185

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/143.8$
 $\Delta/\sigma_s = 17.39$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

- 50
- 73
- 294
- 90
- 60
- 100
- 454
- 74
- 54
- 20
- 70
- 67
- 0
- 17
- 30
- 7
- 134
- 64
- 27
- 10
- 67
- 205
- 128
- 74
- 178
- 94
- 306
- 114

2/2

Survey Area: <i>N/A</i>	Survey Unit: _____	Building: _____
Survey Unit Description <i>East Wing of TRUCK T200</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>ARONIE PARKER</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-4-00</i> Date
<i>ROBERT KELLEY</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-4-00</i> Date
<i>PATRICK CANTON</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-4-00</i> Date
<i>ARONIE PARKER</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-7-00</i> Date
<i>ROBERT KELLEY</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-8-00</i> Date
<i>PATRICK CANTON</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-7-00</i> Date
_____ RCT Printed Name	[REDACTED]	<i>N/A</i> RCT Signature	_____ Date

Quality Control Measurements Performed By

_____ RCT Printed Name	[REDACTED]	<i>N/A</i> RCT Signature	_____ Date
<i>PATRICK CANTON</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>3-8-00</i> Date
_____ RCT Printed Name	_____ Employee #	<i>[Signature]</i> RCT Signature	_____ Date
_____ RCT Printed Name	_____ Employee #	_____ RCT Signature	_____ Date
_____ RCT Printed Name	_____ Employee #	_____ RCT Signature	_____ Date

Survey Reviewed By

<i>Bob Worin</i> RCT Foreman Printed Name	[REDACTED]	<i>[Signature]</i> RCT Foreman Signature	<i>6-6-00</i> Date
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Survey Area: N/A	Survey Unit: EXTERIOR	Building: 7750C
Survey Unit Description: Part 1 Walls of Trance 7750C		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

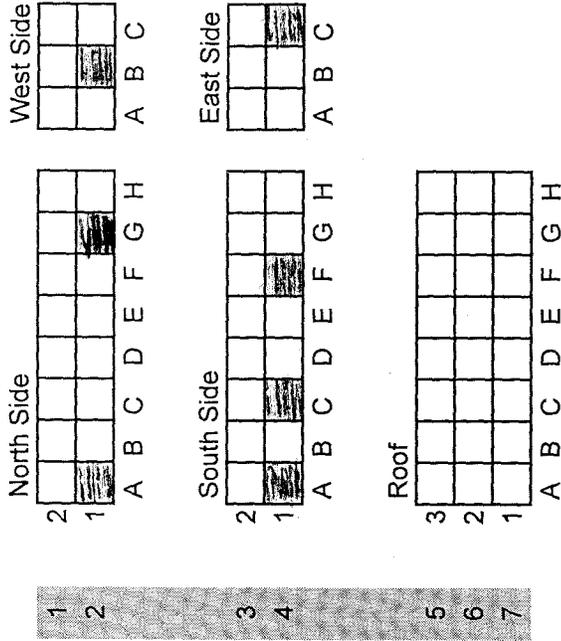
Manufacturer	EBCORNE	EBCORNE	EBCORNE	EBCORNE		
Model	SR-4	SR-4	SR-4	SR-4		
Inst. ID #	1	2	3	4	5	6
Serial #	961	80901	1171	80803		
Cal. Due Date	6-21-00	6-27-00	7-11-00	7-12-00		
Analysis Date	3-8-00	3-8-00	3-8-00	3-8-00		
Instrument Bkg cpm 10-min count time	0.5	10.0	6.4	42.5		
Instrument Eff (%)	33	25	33	25		
Instrument MDA 2-min count time dpm	9.6	69.9	9.0	71.9		

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model	Electra		Electra		Electra		ELECTRA		ELECTRA		ELECTRA	
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2355	1931	2395	1320	2376	1921	2518	1986	2526	1921	2516	1921
Cal. Due Date	6-14-00		7-19-00		8-23-00		5-3-00		8-23-00		8-23-00	
Survey Date	3-4-00		3-4-00		3-4-00		3-7-00		3-7-00		3-8-00	
Alpha Bkg 90-sec cpm count time	3.3	325	4.7	342	3.3	462	2.7	400	4.0	436	2	380
Beta Bkg 90-sec cpm count time												
Alpha Eff (%)	21.94	21.94	21.03	29.35	20.46	29.70	22.35	30.36	20.46	29.70	20.46	29.70
Beta Eff (%)												
Alpha MDA 90-sec dpm count time	39.7	252	47.8	241	42.6	281	36.0	262	46.0	273	35.1	255
Beta MDA 90-sec dpm count time												

Scan Locations:

T750E Exterior



Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>N/A</u>				Survey Unit: <u>Electra</u>			Building: <u>T75CE</u>		
Survey Unit Description: <u>9 Point Roof Investigation + Q.C. scans</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
<u>9 Point Roof Investigation</u>									
E3R1									128
E3R2									105
E3R3									90
E3R4			<u>N/A</u>					<u>N/A</u>	151
E3R5								<u>N/A</u>	94
E3R6									154
E3R7									117
E3R8									94
E3R9									114
<u>Q.C. Scans</u>									
F1S1	8		<u>N</u>	<u>N/A</u>			<u>Y</u>	<u>6</u>	<u>N/A</u>

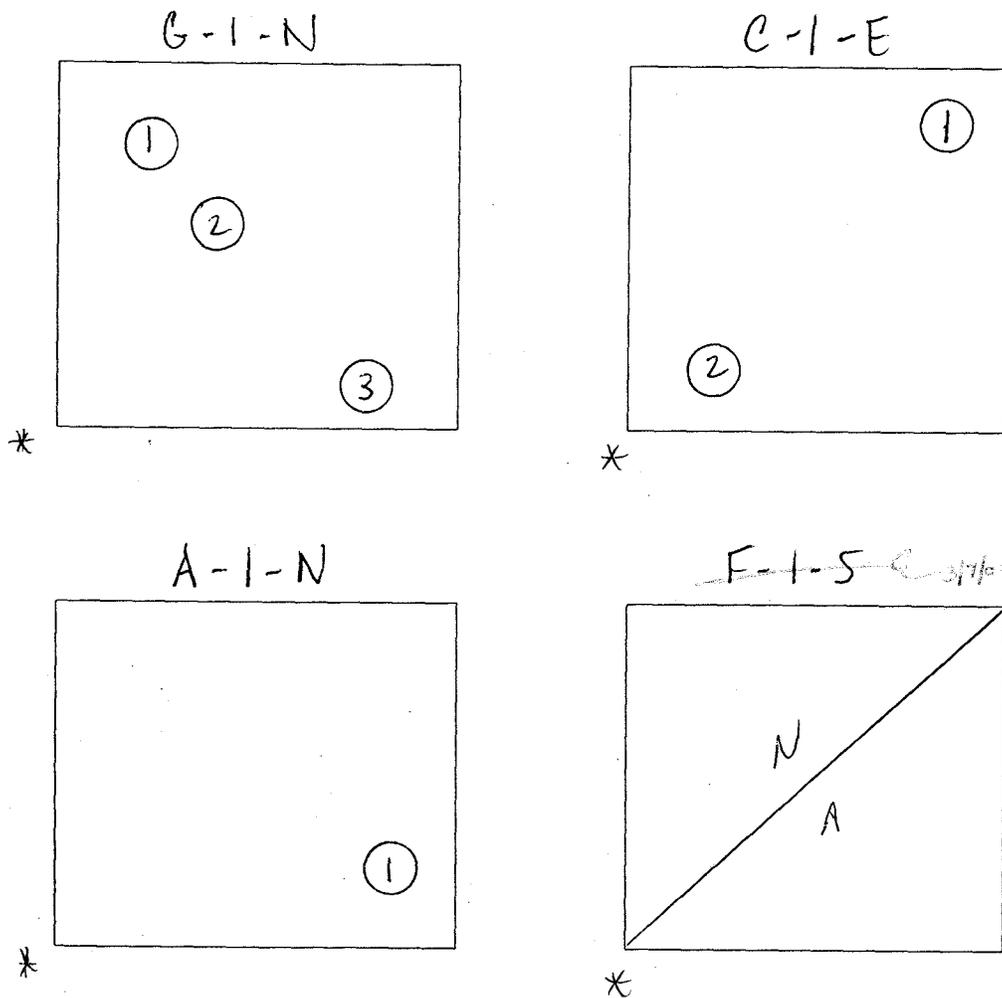
100 gcpm
 100 dpm

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T750E</u>
Survey Unit Description: <u>EXTERIOR</u>		
RCT Initials/Date: <u>DP 3/7/00</u>	RCT Initials/Date: <u>N/A</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

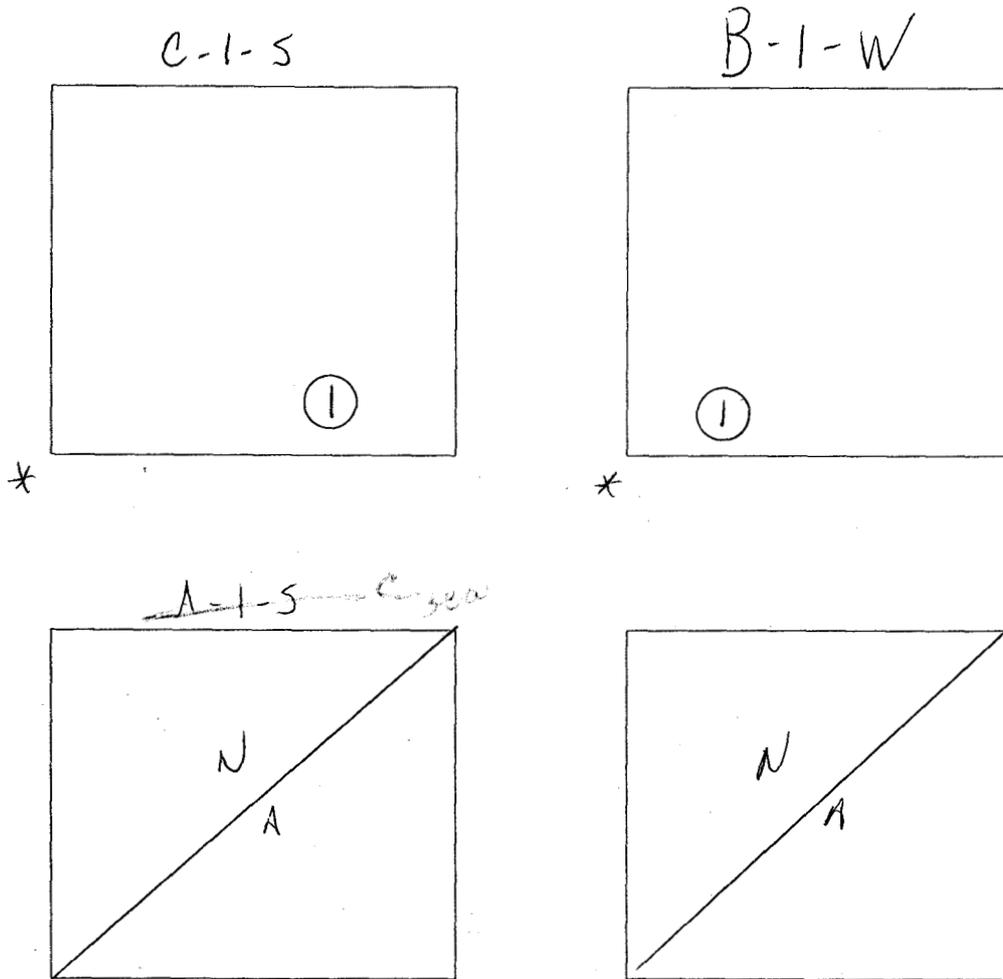
218

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T7SOE</u>
Survey Unit Description: <u>Roof & Walls of Terrace T7SOE</u>		
RCT Initials/Date: <u>OP 3/7/00</u>	RCT Initials/Date: <u>N/A</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" -Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

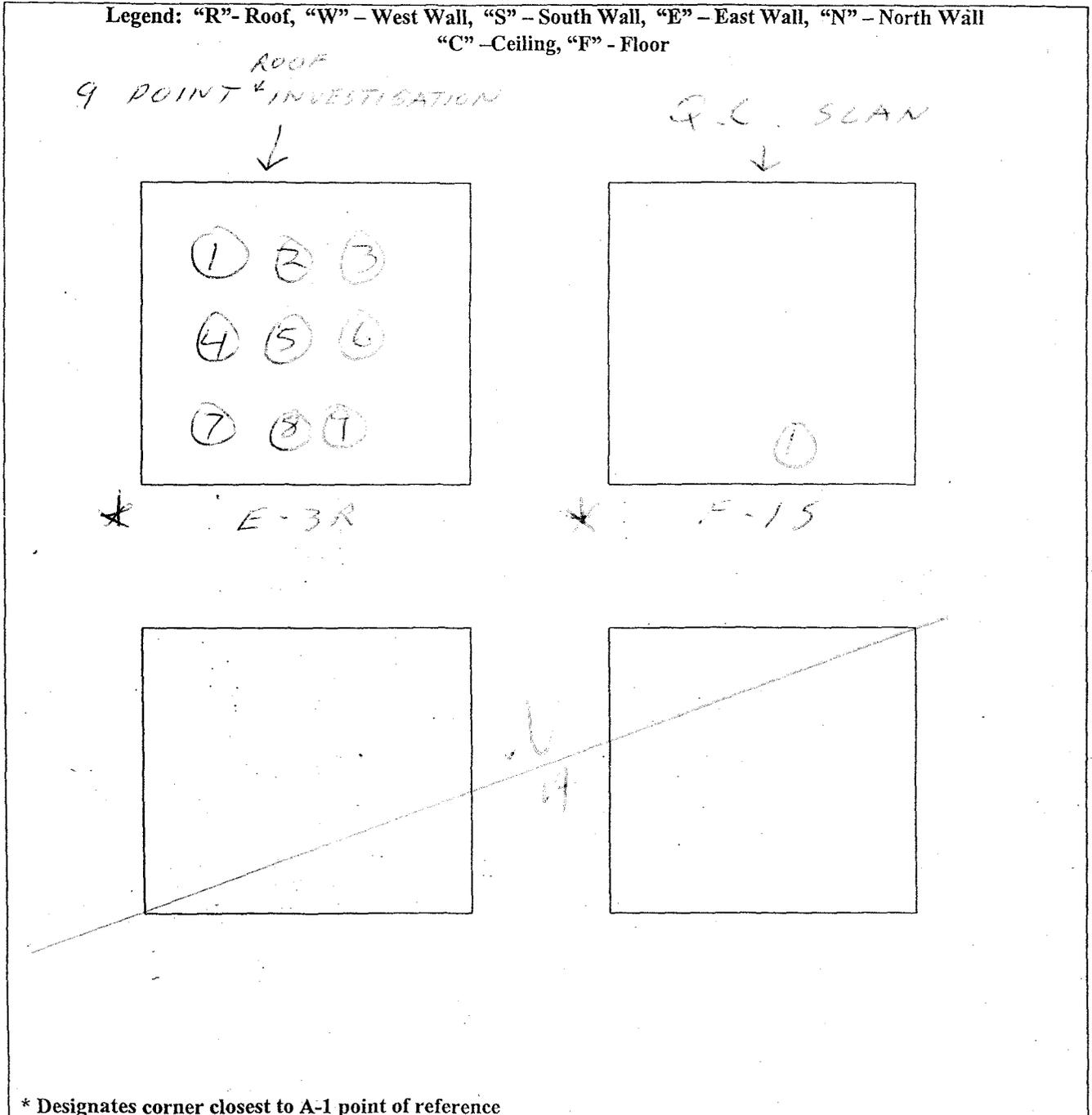
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>NA</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T 750 E</i>
Survey Unit Description: <i>9 POINT ROOF INVESTIGATION AND R.C. SCAN</i>		
RCT Initials/Date: <i>AL 3-7-00</i>	RCT Initials/Date: <i>NA</i>	RCT Initials/Date: <i>NA</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



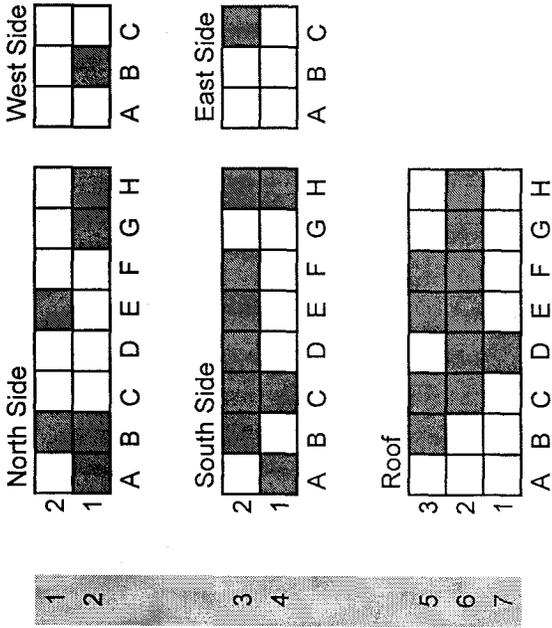
Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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T750E Exterior



□ = one square meter
 ■ = direct & swipe

X-Coordinate	Y-Coordinate
5	2

1	3	5	11	1	4	21	7	2
2	5	3	12	2	1	22	8	4
3	5	5	13	3	3	23	4	6
4	8	3	14	2	2	24	10	2
5	5	1	15	8	6	25	4	3
6	6	3	16	11	3	26	4	7
7	3	4	17	8	2	27	1	2
8	6	6	18	2	5	28	2	3
9	6	5	19	7	6			
10	5	6	20	3	6			

Total Surface Area = 68 m²
 10% Scan Surface Area = 6.8 m²

Survey Area: NIA	Survey Unit: EXTERIOR	Building: T7500
Survey Unit Description <i>Left side of TRAILER T7500</i>		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm2)	
		α	β	α	β	α	β	α	β	α	β	α	β
A-1W		7	7	90	90	6	288	7.3	273	1.3	-15	5.9	-50
B-1W		7	7	90	90	6.7	275	5.3	297	1.4	-22	3.7	-73
B-2W		7	7	90	90	3.5	304	4	281	0.7	-88	3.2	-284
E-2W		7	7	90	90	2	275	6.7	302	4.7	27	2.14	90
G-1W		7	7	90	90	7.3	271	4	253	-3.3	-18	-15	-60
H-1W		7	7	90	90	7.3	275	7.3	202	0	30	0	100
B-1W		7	7	90	90	3.3	397	3.3	201	0	-136	0	-484
A-1S		8	8	90	90	6.3	259	16	281	5.7	22	41.4	74
B-2S		8	8	90	90	12	246	8	230	-4	-16	-19	-54
C-1S		8	8	90	90	8	261	8.7	253	+0.7	-6	3.2-255	-20
C-2S		8	8	90	90	7.3	236	10.7	257	21.4	41	10.4-249	70
D-2S		8	8	90	90	10	253	10	273	250	20	65.10	67
E-2S		8	8	90	90	16	243	12.7	243	170	0	12.8	0
F-2S		8	8	90	90	11.3	249	14	254	0.7	5	3.3	17
A-1S		8	8	90	90	16	233	10	244	0	-9	0	-30
A-2S		8	8	90	90	6	257	12.7	255	6.7	-2	31.9	-7
C-2E		8	8	90	90	10	286	8.7	256	-1.3	-40	-6.2	-134
B-3R		9	9	90	90	4.7	435	26	420	21.3	-19	104.1	-64
C-2R		9	9	90	90	4	406	44	434	40	8	185.5	27
C-3R		9	9	90	90	6	444	28	447	22	3	167.5	10
D-1R		9	9	90	90	6.7	413	24.7	393	18	-20	88	-67
D-2R		9	9	90	90	5.3	432	43.7	421	45.4	-61	221.9	-205
E-2R		9	9	90	90	4.7	435	30	417	33.3	-38	162.3	-128
E-3R		9	9	90	90	2.7	433	44	413	41.3	-22	201.9	-74
F-2R		9	9	90	90	2	306	44	453	42	-33	205.3	-178
F-3R		9	9	90	90	6	432	37.3	400	31.3	28	153	94
G-2R		9	9	90	90	2.7	453	35	484	35.3	41	172.5	306
H-2R		9	9	90	90	3.3	447	32	481	48.7	34	238	114
B-1W QC		12	12	90	90	1	35	7.3	276	5.3	-35	25.9	-111
B-1W QC		12	12	90	90	0	352	8.7	255	8.7	-51	42.5	-192
A-1S QC		12	12	90	90	0	35	6	272	6	-42	20.3	-141
C-1S QC		12	12	90	90	2	332	4	259	2	-125	9.8	-414
H-1S QC		12	12	90	90	0	324	5.3	309	5.3	-75	25.9	-51

Not all measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

222

Survey Area: <i>N/A</i>	Survey Unit: <i>100 Sample 100000</i>	Building: <i>100000</i>
Survey Unit Description		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

<i>MARK LAUSEN</i>		<i>[Signature]</i>	<i>3-28-00</i>
RCT Printed Name		RCT Signature	Date
<i>TOM BIRCHARD</i>		<i>[Signature]</i>	<i>3-28-00</i>
RCT Printed Name		RCT Signature	Date
	Employee #		
RCT Printed Name	Employee #	RCT Signature	Date
	Employee #		
RCT Printed Name	Employee #	RCT Signature	Date
	Employee #		
RCT Printed Name	Employee #	RCT Signature	Date
	Employee #		
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<i>SGERMAN</i>		<i>[Signature]</i>	<i>3-29-00</i>
RCT Foreman Printed Name		RCT Foreman Signature	Date

224

3-216

Survey Area: NA	Survey Unit: Exterior	Building: T750E
Survey Unit Description		
Roof Sample Location		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE	EBERLINE	EBERLINE		
Model	SAC4	BC4	SAC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	823	966	1171	868		
Cal. Due Date	9/6/00	9/15/00	7/11/00	7/12/00		
Analysis Date	3/29/00	3/29/00	3/29/00	3/29/00		
Instrument Bkg. μpm 10-min count time	0.5	38.1	0.6	38.8		
Instrument Eff (%)	33	25	33	25		
Instrument MDA dpm 2-min count time	9.6	68.3	10.1	68.9	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		N.E. Tech.			
Model	Electra		Electra		Electra		Electra			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	2374	1919	2376	1921						
Cal. Due Date	9/8/00		8/23/00							
Survey Date	3/28/00		3/28/00							
Alpha Bkg 90-sec μpm count time	Beta Bkg 90 sec count time μpm									
	4.7	406	3.3	407						
Alpha Eff (%)	Beta Eff (%)									
	20.85	29.89	20.46	29.7						
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time									
	48.2	262	42.6	264	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

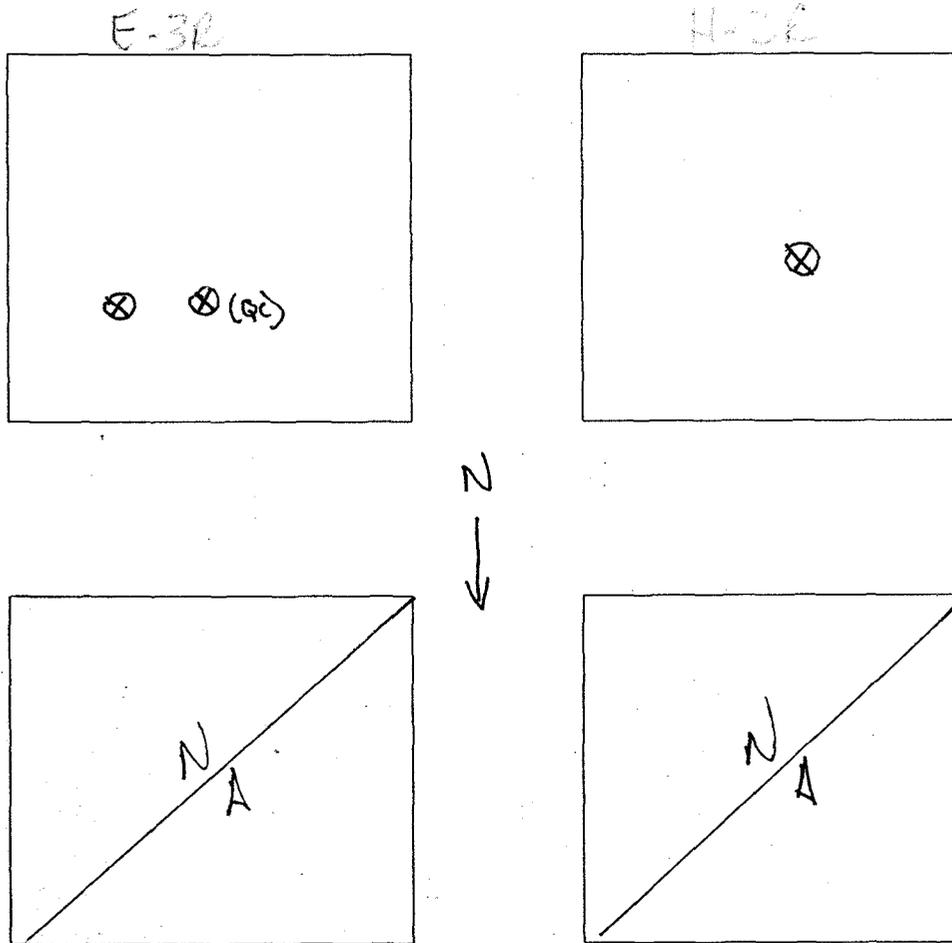
225

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>N/A</i>	Survey Unit: <i>ESTERON</i>	Building: <i>T950F</i>
Survey Unit Description: <i>Roof Sample Locations</i>		
RCT Initials/Date: <i>YMA 3/28/00</i>	RCT Initials/Date: <i>NA</i>	RCT Initials/Date: <i>NA</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" -Ceiling, "F" - Floor**



⊗ SAMPLE CUT OUT

*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T903A	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input checked="" type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
Justification for Classification: This facility may have contained radioactive material from contamination on air samples.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS		[Redacted]	
Radiological Engineer Printed Name	[Redacted]	Radiological Engineer Signature	[Signature]
NOT APPLICABLE	[Redacted]	N/A	N/A
REFS Manager Printed Name	[Redacted]	REFS Manager Signature	[Signature]
H. B. ESTABROOKS	[Redacted]	[Signature]	2/12/00
RESS Manager Printed Name	[Redacted]	RESS Manager Signature	[Signature]
Survey Package Closure:			
RICK ROBERTS ^{ERM 7/11/00}		[Redacted]	
RESS Radiological Engineer Printed Name	[Redacted]	RESS Radiological Engineer Signature	[Signature]
NOT APPLICABLE	[Redacted]	A	N/A
REFS Manager Printed Name	[Redacted]	REFS Manager Signature	[Signature]
H. B. ESTABROOKS ^{Sub 8/14/00}	[Redacted]	[Signature]	8-14-00
RESS Manager Printed Name	[Redacted]	RESS Manager Signature	[Signature]

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T903A		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior		Area (m ²): 240	
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input checked="" type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	100% Floor Carpet <i>Change #3</i>
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T903A
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	INTERIOR FLOORS/WALLS/CEILINGS: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4
	<u>QUALITY ASSURANCE SURVEYS</u> INTERIOR FLOORS/WALLS/CEILINGS: 5 surveys will be taken per direction from radiological engineering.	SEE NOTE 5 SEE NOTE 6

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T903A
Survey Area: Not Applicable		Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning <i>Change #2 ERM 7-11-07</i>	<p>INTERIOR FLOORS:</p> <p>Surface scans will be performed on 100% of the floor ^{carpet} area. This is 48 m² which is 20% of the total interior area of 240 m².</p> <p>The rugs will not be scanned. The rugs within the trailer will be removed before scanning takes place.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>INTERIOR FLOORS:</p> <p>5 percent of total scan area will be taken per direction from radiological engineering. This equals 3 m².</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a systematic basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of wood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha and beta scanning will be performed per Letter RSR-001-00, "Scan Survey Requirements for the Pre-Demolition Survey for the Group B/C Facilities," dated 2/8/00. All surveys will be documented per Letter RSR-002-00, "Radiological Survey Forms for the Pre-Demolition Survey for the Group B/C Facilities," dated 2/9/00.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> <p>$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$</p> <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>	
RICK ROBERTS	
Project RE Printed Name	Project RE Signature
H.B. ESTABROOKS	
RESS RE Printed Name	RESS RE Signature
	Date

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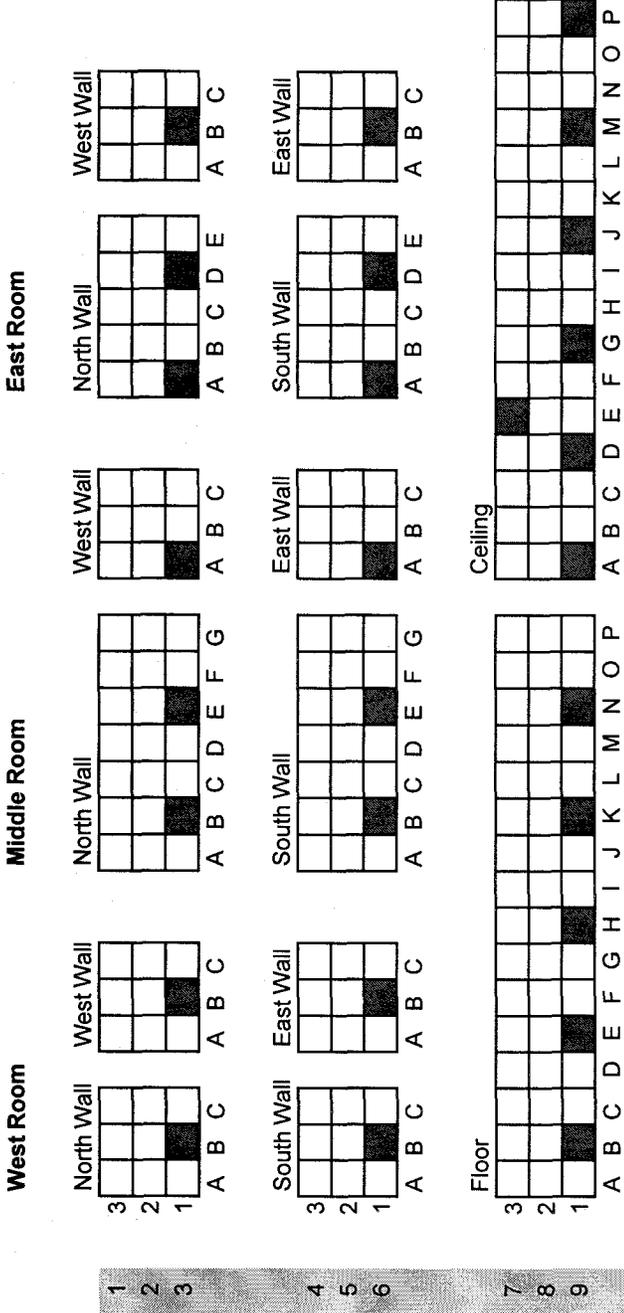
240

SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Floor Area (m²): 48	Total Area (m²): 240
<p>For Class 2 Area, survey locations will be designated in a systematic manner. It will be assumed that a square grid will be used for the grid layout.</p> <p>$L = (A/n)^{1/2} = (240/28)^{1/2} = 2.93 = 3$ meters</p> <p>A random starting location will be chosen for the 3 meter X 3 meter square grid pattern. Survey locations will be at the center of the grid.</p> <p>SEE ATTACHED SURVEY MAP</p>	

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T903A Interior

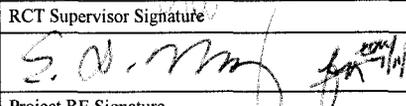
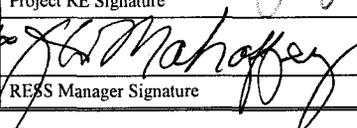


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SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: T903A	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion		RCT Supervisor	PRE
Scan Surveys		<input checked="" type="checkbox"/>	RBW
Total Activity Surveys		<input checked="" type="checkbox"/>	EBM
Exposure Rate Surveys		N/A	N/A
Removable Surveys		<input checked="" type="checkbox"/>	EBM
Media Samples		N/A	N/A
Volumetric Samples		N/A	N/A
All Surveys and Samples Accounted For		RCT Supervisor	PRE
Scan Surveys		<input checked="" type="checkbox"/>	EBM
Total Activity Surveys		<input checked="" type="checkbox"/>	EBM
Exposure Rate Surveys		N/A	N/A
Removable Surveys		<input checked="" type="checkbox"/>	EBM
Media Samples		N/A	N/A
Volumetric Samples		N/A	N/A
Comments:			
RCT Supervisor Printed Name [Redacted]		RCT Supervisor Signature 	
Project RE Printed Name RICK ROBERTS ERIC D. McNamey		Project RE Signature 	
RESS Manager Printed Name H. B. ESTABROOKS J. W. Mahaffey		RESS Manager Signature 	
		Date 6-12-00 8-14-00	

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KDM / 6-2-00	
7.1[1]	DQOs implemented as prescribed	KDM / 6-2-00	
7.1[2]	All required supporting documents present	KDM / 6-2-00	
7.1[3]	Outliers / anomalies addressed	KDM / 6-2-00	
7.2	Data Validation	KDM / 6-2-00	
7.2.1	Survey/Sample Precision	KDM / 6-2-00	see spreadsheets
7.2.2	Survey Accuracy	KDM / 6-2-00	
	Sample Accuracy	N/A	no samples taken
7.2.3	Data Representative of survey unit	KDM / 6-2-00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM / 6-2-00	100%
7.2.5	Data Comparable to related units	KDM / 6-2-00	yes, Group B
7.3	DQA complete	KDM / 6-2-00	see spread sheets
7.3[3]	Any measurement > DCGL _w ?	N/A	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	ds 6/13/00	NONE
	Package submitted to project management		
9.1	Records to Records Center (copy to project files)	KDM / 6-27-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Interior
Building: T903A
Survey Unit Description: Walls, floors and ceiling of T903A

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. Various notes are provided in the Survey Package. See Survey Package.
3. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
4. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
5. Spreadsheets provided to perform statistical calculations.
6. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
7. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
8. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. O. [Signature] 6/2/00

Removable Activity
(dpm/100 cm²) Alpha

Survey Area - N/A
Survey Unit - Interior
Building - T903A
Survey Unit Description - Walls, ceiling and floor of Trailer T903A
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 0.5 dpm/100 cm²
Std Dev 1.7 dpm/100 cm²

No measurement exceeds the DCGL_w

- 0.9
- 0.0
- 1.8
- 2.1
- 1.5
- 1.8
- 0.9
- 1.5
- 0.3
- 0.9
- 1.5
- 0.3
- 3.6
- 0.0
- 1.2
- 0.9
- 1.5
- 1.8
- 0.6
- 1.5
- 3.3
- 0.6
- 1.5
- 3.3
- 0.6
- 0.0
- 0.3
- 3.6

Removable Activity
(dpm/100 cm²) Beta

32.8
4.8
3.2
20.8
-3.2
23.2
-7.2
-21.2
7.2
-1.2
16.8
5.2
-1.2
0.8
19.2
-19.2
-15.2
-0.8
22.8
0.8
5.2
-51.2
-21.2
35.2
16.8
-9.2
1.2
-19.2

Survey Area - N/A
Survey Unit - Interior
Building - T903A
Survey Unit Description - Walls, ceiling and floor of Trailer T903A
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean 1.6 dpm/100 cm²
Std Dev 18.7 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

3.2
9.2
6.0
-6.0
15.1
9.2
3.2
15.6
0.0
6.0
18.3
30.7
36.7
-11.9
11.9
9.2
13.2
0.0
0.0
6.4
23.0
3.4
6.4
-19.6
9.8
-12.7
0.0
0.0

Survey Area - N/A
Survey Unit - Interior
Building - T903A
Survey Unit Description - Walls, ceiling and floor of Trailer T903A
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 6.7 dpm/100 cm²
Std Dev 12.1 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
B-1N (wr)	3.2	9.6	-6.4	6.4	-100
B-1W (wr)	9.2	0.0	9.2	4.6	200
B-1N (mr)	15.1	9.6	5.5	12.35	44.53441
E-1N	9.2	2.9	6.3	6.05	104.1322
A-1N	18.3	15.8	2.5	17.05	14.66276

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/12.1$
 $\Delta/\sigma_s = 4.13$ (default 3.0)
 Sign p = 0.998650
 N = 10.88
 $10.88 * 1.2 = 13.05$
 N = 14

**Total Surface Activity
(dpm/100 cm²) Beta**

-141.7
-19.3
-322
-231.8
-218.9
-347.7
-454
-206.1
-264
-164.2
-183.5
-154.5
-193.2
-296.2
-215.7
-251.1
84.2
-165
-37
94.3
117.8
-57.2
144.8
-101
151.5
215.5
90.9
6.7

Survey Area - N/A
Survey Unit - Interior
Building - T903A
Survey Unit Description - Walls, ceiling and floor of Trailer T903A
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean -111.4 dpm/100 cm²
Std Dev 172.9 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
B-1N (wr)	-141.7	13.9	-155.6	-63.9	243.5055
B-1W (wr)	-19.3	-118.5	99.2	-68.9	-143.9768
B-1N (mr)	-218.9	139.5	-358.4	-39.7	902.7708
E-1N	-347.7	-101.1	-246.6	-224.4	109.893
A-1N	-183.5	-66.2	-117.3	-124.85	93.95274

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/172.9$
 $\Delta/\sigma_s = 14.46$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88 * 1.2 = 13.05$
 N = 14

Survey Area: NA	Survey Unit: [REDACTED]	Building: T903A
Survey Unit Description Interior Walls, Floor, Pool		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

[REDACTED]	P Chittum	[REDACTED]	<i>P Chittum</i>	3-6-00
	RCT Printed Name		RCT Signature	Date
	A Paeked	[REDACTED]	<i>A Paeked</i>	3-6-00
	RCT Printed Name		RCT Signature	Date
	A Christopher Van	[REDACTED]	<i>A Christopher Van</i>	3-7-00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	NA	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

[REDACTED]	M Lawson	[REDACTED]	<i>M Lawson</i>	3-7-00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	NA	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Row Morstan	[REDACTED]	<i>Row Morstan</i>	3-7-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

Survey Area: 11A	Survey Unit: INTERIOR	Building: T903A
Survey Unit Description INTERIOR		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

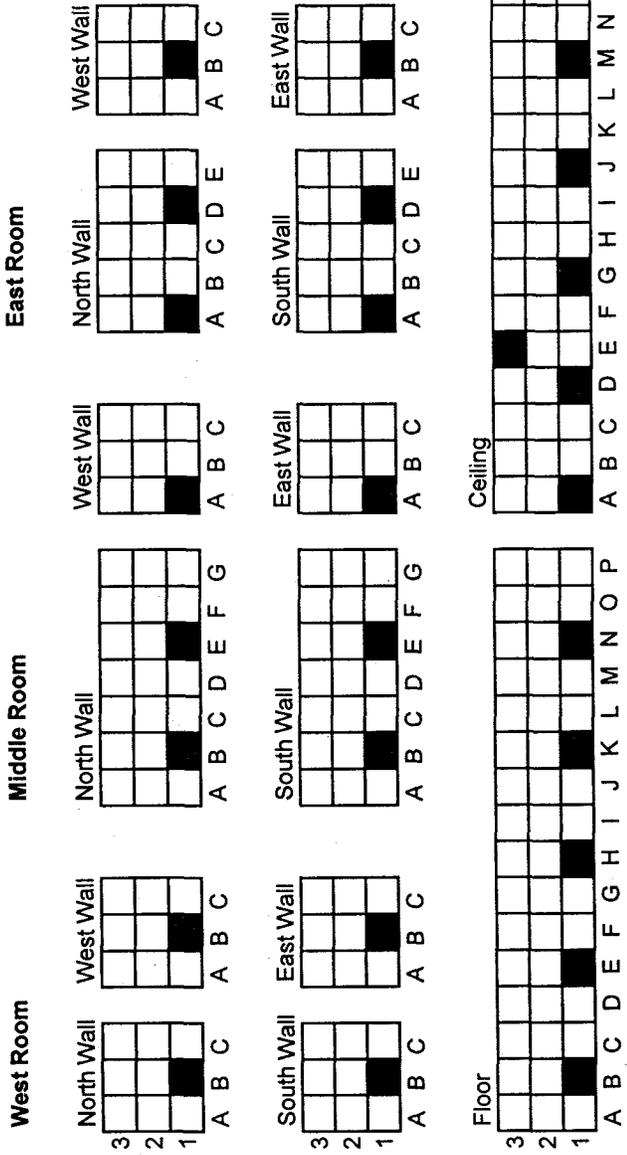
Manufacturer	ESPEC	ESPEC	ESPEC	ESPEC	ESPEC	ESPEC
Model	SR4	SR4	SR4	SR4	SR4	SR4
Inst. ID #	1	2	3	4	5	6
Serial #	1170	1171	961	8973	8000	80961
Cal. Due Date	6-30-00	7-11-00	6-21-00	3-27-00	7-12-00	6-12-00
Analysis Date	3-7-00	3-7-00	3-7-00	3-7-00	3-7-00	3-7-00
Instrument Bkg 10-min count time	0.3	0.3	0.4	40.3	38.3	40.0
Instrument Eff (%)	33	33	33	25	25	25
Instrument MDA 2-min count time	8.3	9.6	9.0	70.1	68.5	70.1

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	7		8		9		10	11	12
Serial # / Probe #	1552	1419	2376	1921	1375	1368			
Cal. Due Date	5-3-00		8-23-00		7-19-00				
Survey Date	3-6-00		3-6-00		3-7-00				
Alpha Bkg 90-sec cpm count time	2.7	355	2.0	476	2.0	407			
Beta Bkg 90-sec cpm count time									
Alpha Eff (%)	21.81	31.06	20.46	29.7	20.87	28.62			
Beta Eff (%)									
Alpha MDA 90-sec dpm count time	367	2363	321	222.2	3114	273.5			
Beta MDA 90-sec dpm count time									

22 251

T903A Interior



SCANS

2000-01
 1-10
 50 50 50

X-Coordinate	Y-Coordinate
23	3

X	Y
11	6
21	7

□ = one square meter
 ■ = direct & swipe

Total Surface Area = 240 m²
 10% Scan Surface Area = 24 m²

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 3-244

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Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: NA		Survey Unit: INTERIOR			Building: T903A				
Survey Unit Description: WALLS FLOW									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
D-1F	2	7	N		1	8	N		
D-2F	2	7	N		1	8	N		
D-3F	2	7	N		1	8	N		
E-1F	2	7	N		1	8	N		
E-2F	2	7	N		1	8	N		
E-3F	2	7	N		1	8	N		
F-1F	2	7	N		1	8	N		
F-2F	2	7	N		1	8	N		
F-3F	2	7	N		1	8	N		
G-1F	2	7	N		1	8	N		
G-2F	2	7	N	NA	1	8	N	NA	NA
G-3F	2	7	N		1	8	N		
H-1F	2	7	N		1	8	N		
H-2F	2	7	N		1	8	N		
H-3F	2	7	N		1	8	N		
I-1F	2	7	N		1	8	N		
I-2F	2	7	N		1	8	N		
I-3F	2	7	N		1	8	N		
J-1F	2	7	N		1	8	N		
J-2F	2	7	N		1	8	N		
J-3F	2	7	N		1	8	N		
K-1F	2	7	N		1	8	N		
K-2F	2	7	N		1	8	N		
K-3F	2	7	N		1	8	N		
L-1F	2	7	N		1	8	N		
L-2F	2	7	N		1	8	N		

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Survey Area: <u>N/A</u>	Survey Unit: <u>202050</u>	Building: <u>T-703A</u>
Survey Unit Description		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)		
		α	β	α	β	α	β	α	β	α	β	α	β	
WEST R				90	90									
B-IN		7	7	90	90	2.0	300	2.7	380	0.7	-44	3.2	-11.7	
B-IW		7	7	90	90	3.7	350	5.7	380	2.0	-46	7.2	-19.3	
B-IS		7	7	90	90	3.0	350	5.3	351	1.3	-100	6.0	-32.0	
B-IE		7	7	90	90	3.3	350	5.0	350	-1.7	-72	-6.5	-23.5	
Middle				90	90									
B-IN		7	7	90	90	1.5	300	5.0	381	3.5	-68	15.1	-213.7	
E-IN		7	7	90	90	1.3	300	5.7	381	2.0	-103	9.2	-347.7	
A-IW		7	7	90	90	3.3	313	4.0	382	0.7	-141	3.2	-49.0	
B-IS		7	7	90	90	3.3	300	6.7	391	3.4	-64	15.6	-206.1	
E-IS		7	7	90	90	3.3	307	3.3	380	0	-82	0	-244.0	
A-IE		7	7	90	90	4.0	317	5.3	360	1.3	-51	6.0	-143.0	
EAST R				90	90									
A-IN		7	7	90	90	1.3	300	5.3	310	4.0	-57	13.3	-183.0	
D-IN		7	7	90	90	1.3	300	5.0	310	6.7	-93	30.7	-159.0	
B-IW		7	7	90	90	3.3	300	4.3	360	3.0	-90	36.7	-193.2	
A-IS		7	7	90	90	3.3	300	2.7	383	-2.6	-96	-1.3	-206.2	
D-IS		7	7	90	90	2.7	316	5.0	379	2.6	-67	11.9	-216.0	
B-IE		7	7	90	90	3.3	300	3.3	380	2.0	-78	9.2	-251.1	
				90	90									
				90	90									
				90	90									
				90	90									
				90	90									
				90	90									
				90	90									
				90	90									
WEST E	B-INQC		9	9	90	90	2.0	777	4.0	301	2.0	40	9.6	13.9
WEST R	B-IWQC		9	9	90	90	2.7	360	2.7	326	0	-34	0	-18.5
MID. R	B-ISQC		9	9	90	90	1.3	326	3.3	366	2.0	40	9.6	13.9
MID. R	E-INQC		9	9	90	90	2.7	317	3.3	288	0.6	-29	2.9	-101.1
EAST R	A-INQC		9	9	90	90	2.7	306	6.0	288	3.3	-19	15.2	-66.2

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

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Survey Area: <u>NIA</u>	Survey Unit: <u>INTERIOR</u>	Building: <u>1905A</u>
Survey Unit Description: <u>Trinity House & Chapel of Trinity 1905A</u>		

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
		WEST							
B-IN		1	4	0	48.5	-0.3	8.2	-0.9	32.8
B-W		2	5	0.5	39.5	0	7.2	0	7.8
B-IS		3	6	1	41	0.6	2.0	1.0	3.2
B-IE		1	4	1	40.5	0.7	2.2	2.1	20.8
MIDD									
B-IN		2	5	0	39.5	-0.3	-0.8	-1.5	-3.2
E-IN		3	6	1	40	0.6	0.8	1.5	23.2
A-W		1	4	0	38.5	-0.3	-1.8	-0.9	-7.2
B-IS		2	5	0	35	-0.5	0.3	-1.5	-21.2
E-IS		3	6	0.5	42	0.1	1.8	0.3	7.2
A-IE		1	4	0	40	-0.3	-0.3	-0.5	-1.2
EAST									
A-IN		2	5	0	40.2	-0.3	7.2 7.2	-1.5	35.2 35.2 / 10.5
D-IN		3	6	0.5	41.5	0.1	1.2	0.3	5.2
B-W		1	4	1.5	40	1.2	-0.3	3.0	-1.2
A-IS		2	5	0.5	38.5	0	0.2	0	0.3
D-IS		3	6	0	45	-0.4	4.8	-1.2	19.2
B-IE		1	4	0	35.5	-0.3	-9.8	-0.9	-19.2
FLOOR									
B-IF		2	5	0	31.5	-0.5	-3.8	-1.5	-15.2
E-IF		3	6	1	40	0.6 0.6	-0.2	0.3 0.3	-0.8
A-IF		1	4	0.5	40	0.2	5.1	0.0	22.8
K-IF		2	5	0	38.5	-0.3	0.2	-1.5	0.3
N-IF		3	6	1.5	40.5	1.1	1.3	3.3	5.2
CEILING									
A-IC		1	4	0.5	21.5	0.2	-12.5	0.0	-51.2
D-IC		2	5	1	32	0.5	-5.3	1.5	-21.2
E-IC		3	6	1.5	41	1.1	8.0	3.3	35.2
G-IC		1	4	0.5	35.2 / 44	0.2	4.2	0.0	16.8
J-IC		2	5	0.5	30	0	-2.5	0	-9.2
M-IC		3	6	0.5	40.5	0.1	0.3	0.3	1.2
P-IC		1	4	1.5	35.5	0.2	-4.8	3.0	-19.2

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Survey Area: NA	Survey Unit: INTERIORS	Building: T903A
Survey Unit Description FLOOR, BELOW CARPET		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

M LAWSON			3-11-00
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Row Worstan			3-13-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: NA	Survey Unit: Interior	Building: T903A
Survey Unit Description FLOOR, UNDER CARPET		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	Eberline				
Model	SAC4	BC4				
Inst. ID #	1	2	3	4	5	6
Serial #	1170	BC928				
Cal. Due Date	6-30-00					
Analysis Date	3-11-00	3-11-00				
Instrument Bkg cpm 10-min count time	0.5	40.9				
Instrument Eff (%)	33	25				
Instrument MDA 2-min count time dpm	9.6	70.6				

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.					
Model	Electra		Electra		Electra					
Inst. ID #	7		8		9		10	11	12	
Serial # / Probe #	1395	1368								
Cal. Due Date	7-19-00									
Survey Date	3-11-00									
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	2.0	389							
Alpha Eff (%)	Beta Eff (%)	20.89	28.68							
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	34.4	267.6							

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Survey Area: NA	Survey Unit: INTERIOR	Building: T903A
Survey Unit Description FLOOR, UNDER CARPET		

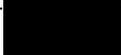
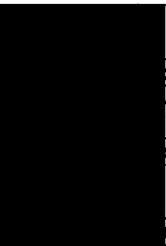
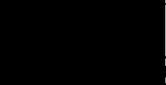
Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
Z-IF		1	2	0.5	86	0.0	45.1	0.0	180.4
K-IF		1	2	0.0	84	-0.5	43.1	-1.5	172.4
N-IF		1	2	0.0	80	-0.5	39.1	-1.5	156.4
NA									

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T903A	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/>			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS			
Radiological Engineer Printed Name		Radiological Engineer Signature	
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	
H. B. ESTABROOKS			
RESS Manager Printed Name		RESS Manager Signature	
Survey Package Closure:			
RICK ROBERTS <i>ERM 7/11/00</i>			
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	
H. B. ESTABROOKS <i>12th 8/14/00</i>			
RESS Manager Printed Name		RESS Manager Signature	

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T903A		Type: 1	
Survey Area: Not Applicable		Survey Unit: Exterior		Area (m ²): 162	
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	4	0	Biased
Building:		Type: <i>Change #4 2001 4/1/00</i>		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T903A
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	EXTERIOR WALLS/ROOF: 28 surveys will be taken per the attached survey map.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4
	<u>QUALITY ASSURANCE SURVEYS</u> EXTERIOR WALLS/ROOF: 5 surveys will be taken per direction from radiological engineering.	SEE NOTE 5 SEE NOTE 6

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T903A
Survey Area: Not Applicable		Survey Unit: Exterior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning <i>Change to 6 EMM 7/11/00</i>	<p>EXTERIOR WALLS/ROOF: Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p><i>No less than</i> 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u> EXTERIOR WALLS/ROOF: 5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of wood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha and beta scanning will be performed per Letter RSR-001-00, "Scan Survey Requirements for the Pre-Demolition Survey for the Group B/C Facilities," dated 2/8/00. All surveys will be documented per Letter RSR-002-00, "Radiological Survey Forms for the Pre-Demolition Survey for the Group B/C Facilities," dated 2/9/00.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T903A		
Survey Area: Not Applicable	Survey Unit: Exterior		
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.			
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS		<i>[Signature]</i>	2/17/10
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS		<i>[Signature]</i>	2/17/10
RESS RE Printed Name		RESS RE Signature	Date

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SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T903A
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: T-903A was used as Laboratory Trailer for analysis of air/particle samples. T-903A is 46' long by 9'10" wide and 8' high.	
Floor Area (m²): 48	Total Area (m²): 162
SEE ATTACHED SURVEY MAP	

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KDM/6-2-00	
7.1[1]	DQOs implemented as prescribed	KDM/6-2-00	
7.1[2]	All required supporting documents present	KDM/6-2-00	
7.1[3]	Outliers / anomalies addressed	KDM/6-2-00	
7.2	Data Validation	KDM/6-2-00	
7.2.1	Survey/Sample Precision	KDM/6-2-00	see spreadsheets
7.2.2	Survey Accuracy	KDM/6-2-00	
	Sample Accuracy	KDM/6-2-00	
7.2.3	Data Representative of survey unit	KDM/6-2-00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM/6-2-00	100%
7.2.5	Data Comparable to related units	KDM/6-2-00	yes, Group B
7.3	DQA complete	KDM/6-2-00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	KDM/6-2-00	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	dr 6/13/00	NONE
	Package submitted to project management	KDM/6-2-00	
9.1	Records to Records Center (copy to project files)	KDM/8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Exterior
Building: T903A
Survey Unit Description: Roof and walls of T903A

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. Various notes are provided in the Survey Package. See Survey Package.
3. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
4. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
5. Spreadsheets provided to perform statistical calculations.
6. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
7. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
8. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. D. My 6/2/00

Removable Activity
(dpm/100 cm²) Alpha

-1.5
1.8
-2.1
0.0
0.3
-0.6
3.0
6.4
-2.1
-1.5
-1.2
-0.6
3.0
-1.2
-0.6
0
3.3
-0.6
1.5
-2.7
0.9
0.0
3.3
0.9
0.0
-2.7
2.4
1.5

Survey Area - N/A
Survey Unit - Exterior
Building - T903A
Survey Unit Description - Roof and walls of Trailer T903A
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 0.4 dpm/100 cm²
Std Dev 2.1 dpm/100 cm²
No measurement exceeds the DCGL_w

**Removable Activity
(dpm/100 cm²) Beta**

Survey Area - N/A
 Survey Unit - Exterior
 Building - T903A
 Survey Unit Description - Roof and walls of Trailer T903A
 Removable Contamination Data Sheet
 DCGL_w 1000 dpm/100 cm²
 n 28
 Mean 6.6 dpm/100 cm²
 Std Dev 16.9 dpm/100 cm²

No measurement exceeds the DCGL_w

-21.6
 22.8
 8.4
 14.4
 12.8
 -17.6
 9.6
 10.8
 0.4
 -1.6
 54.8
 10.4
 -7.6
 0.8
 -13.6
 24.4
 6.8
 2.4
 -15.6
 4.8
 -11.6
 30.4
 30.4
 2.4
 8.4
 -9.2
 6.4
 22.4

**Total Surface Activity
(dpm/100 cm²) Alpha**

5.9
-6.4
3.2
21.4
-15.0
0.0
0.0
41.4
-19.0
3.3
16.2
0.0
12.8
3.3
0.0
31.9
-6.2
104.1
195.5
107.5
88.0
221.9
162.8
201.9
205.3
153.0
172.5
238.0

Survey Area - N/A
Survey Unit - Exterior
Building - T750E
Survey Unit Description - Roof and walls of Trailer T750E
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 69.4 dpm/100 cm²
Std Dev 87.4 dpm/100 cm²

10 measurements exceeds the DCGL_w
11 measurements exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
G-1N	-15.0	25.9	-40.9	5.45	-750.4587
B-1W	0.0	42.5	-42.5	21.25	-200
A-1S	41.4	29.3	12.1	35.35	34.22914
C-1S	3.3	9.8	-6.5	6.55	-99.23664
H-1S	0.0	25.9	-25.9	12.95	-200

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/87.4$
 $\Delta/\sigma_s = 0.57$ (default 0.50)
 Sign p = 0.691462
 N = 73.82
 $73.82 * 1.2 = 88.58$
 N = 89

Note: Where TSA results are elevated due to Po-210 concentrations, the Post Survey calculations can indicate that more survey points are needed. These numbers are artificially high because the elevated results are due to Po-210, and not due to DOE-added radionuclides. Consequently, where the presence of NORM (specifically Po-210) is confirmed through alpha spec analysis, Post Survey Statistics Calculations that use survey (TSA) results are not applicable as a means of checking TSA survey frequencies. Adequate survey frequency would be indicated if results attained from analytical samples were used instead.

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**Total Surface Activity
(dpm/100 cm²) Beta**

-347
-170
-200
-271
-304
-210
-40
-40
10
-17
20
194
10
-34
94
-237
201
-33
-135
293
242
394
158
394
256
498
428
209

Survey Area - N/A
Survey Unit - Exterior
Building - T903A
Survey Unit Description - Roof and walls of Trailer T903A
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean 48.7 dpm/100 cm²
Std Dev 237.3 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
C-1E	-33	155	-188	61	-308.1967
J-2S	-34	-131	97	-82.5	-117.5758
I-2S	10	-74	84	-32	-262.5
A-2E	-237	40	-277	-98.5	281.2183
F-1S	20	-212	232	-96	-241.6667

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/237.3$
 $\Delta/\sigma_s = 10.54$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88 * 1.2 = 13.05$
 N = 14

Survey Area: N/A	Survey Unit: EXTERIOR	Building: 1105A
Survey Unit Description ROOF & WALLS OF TRUCK 1105A		

SURVEY SIGNATURE SHEET

Removable / To [] Surface Activity Performed By

ARONIE PARKER RCT Printed Name	[REDACTED]	<i>A. Parker</i> RCT Signature	3.4.00 Date
MARK LAWSON RCT Printed Name	[REDACTED]	<i>M. Lawson</i> RCT Signature	3.4.00 Date
PATRICK CHITMAN RCT Printed Name	[REDACTED]	<i>P. Chitman</i> RCT Signature	3.4.00 Date
ROBERT KELLEY RCT Printed Name	[REDACTED]	<i>R. Kelley</i> RCT Signature	3.4.00 Date
A. CHRISTOPHER RCT Printed Name	[REDACTED]	<i>A. Christopher</i> RCT Signature	3.7.00 Date
ARONIE PARKER RCT Printed Name	[REDACTED]	<i>A. Parker</i> RCT Signature	3.7.00 Date
ROBERT KELLEY RCT Printed Name	[REDACTED]	<i>R. Kelley</i> RCT Signature	3.7.00 Date

Quality Control Measurements Performed By

PATRICK CHITMAN RCT Printed Name	[REDACTED]	<i>P. Chitman</i> RCT Signature	3.7.00 Date
PATRICK CHITMAN RCT Printed Name	[REDACTED]	<i>P. Chitman</i> RCT Signature	3.8.00 Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Bob Worster RCT Foreman Printed Name	[REDACTED]	<i>B. Worster</i> RCT Foreman Signature	3.6.00 Date
---	------------	--	----------------

Survey Area: <u>VIA</u>	Survey Unit: <u>EXTENSION</u>	Building: <u>T905A</u>
Survey Unit Description <u>Deck + Windows on T905A</u>		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

<u>Mark Green</u>		<u>[Signature]</u>	<u>5/10/00</u>
RCT Printed Name		RCT Signature	Date
<u>PATRICK CHITMAN</u>		<u>[Signature]</u>	<u>3/7/00</u>
RCT Printed Name		RCT Signature	Date
	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT ID # 8			
	RCT Printed Name	Employee #	RCT Signature
RCT ID # 9			
	RCT Printed Name	Employee #	RCT Signature
RCT ID # 10			
	RCT Printed Name	Employee #	RCT Signature
RCT ID # 11			
	RCT Printed Name	Employee #	RCT Signature
RCT ID # 12			
	RCT Printed Name	Employee #	RCT Signature

Survey Reviewed By

<u>Ben Wolsten</u>		<u>[Signature]</u>	<u>6/6/00</u>
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: N/A	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description: ROOF & WALLS OF TRUSS T903A.		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	ESPECIALLY	ESPECIALLY	ESPECIALLY	ESPECIALLY	ESPECIALLY	ESPECIALLY
Model	SAC-4	SAC-4	SAC-4	BC-4	BC-4	BC-4
Inst. ID #	1	2	3	4	5	6
Serial #	1170	1171	961	BC928	BC868	BC961
Cal. Due Date	6-30-00	7-11-00	6-21-00	3-27-00	7-12-00	6-27-00
Analysis Date	3-4-00	3-4-00	3-4-00	3-4-00	3-4-00	3-4-00
Instrument Bkg ^{cpm} 10-min count time	0.5	0.9	0.7	41.9	38.8	39.9
Instrument Eff (%)	33	33	33	25	25	25
Instrument MDA 2-min count time ^{dpm}	9.6	11.4	10.6	71.4	68.9	69.8

Total Surface Activity Instrument Data

Manufacturer		N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model		Electra		Electra		Electra		ELECTRA		ELECTRA		ELECTRA	
Inst. ID #		7		8		9		10		11		12	
Serial # / Probe #		2305	1931	2378	1936	2572	1971	1395	1300	2378	1956	1315	1300
Cal. Due Date		6-14-00		6-30-00		8-03-00		7-13-00		5-3-00		7-19-00	
Survey Date		3-4-00		3-4-00		3-4-00		3-4-00		3-7-00		3-7-00	
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90-sec ^{cpm} count time	1.3	411	2.0	307	2.7	323	8	345	3.3	345	2	319
Alpha Eff (%)	Beta Eff (%)	21.49	29.94	22.05	20.36	20.44	20.70	21.03	29.85	22.35	30.36	20.87	28.28
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	28.6	263	32.1	255	31.3	236	59.7	242	39.0	234	34.4	254

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Survey Area: <u>N/A</u>	Survey Unit: <u>exterior</u>	Building: <u>T905A</u>
Survey Unit Description: <u>Part of walls of T905A</u>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6- 12 3/7/0
Serial #						
Cal. Due Date						
Analysis Date						
Instrument Bkg ^{cpm} 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time <i>dpm</i>						

Total Surface Activity Instrument Data

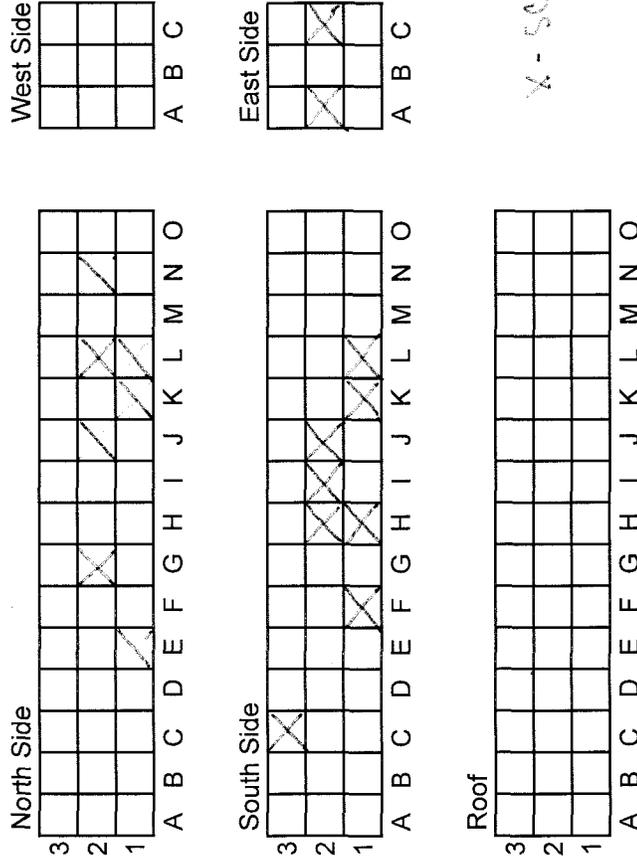
Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	13 7 3/7/00		14 8		9		10	11	12 12
Serial # / Probe #	2576	1921	2576	1921					3/7/0
Cal. Due Date	8/23/00		8/23/00						
Survey Date	3/7/00		3/8/00						
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90-sec ^{cpm} count time	3.3	386	4.7	342				
Alpha Eff (%)	Beta Eff (%)	20.46	29.70	20.46	29.70				
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	42.6	257	49.1	243				

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T903A Exterior



X - SCAN LOCATION

1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

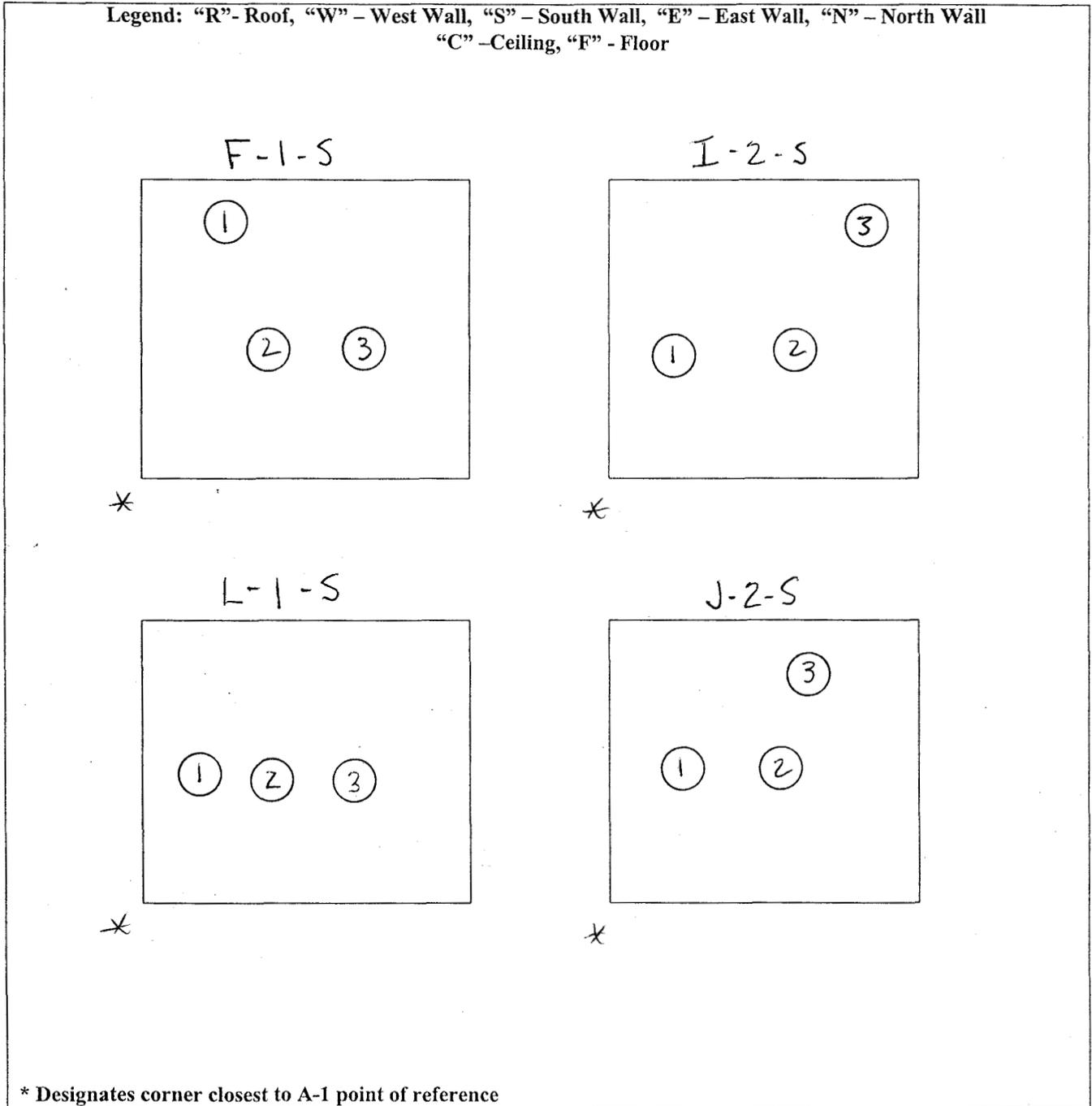
288

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T903A</u>
Survey Unit Description: <u>EXTERIOR</u>		
RCT Initials/Date: <u>DJF 3/7/00</u>	RCT Initials/Date: <u>N/A</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

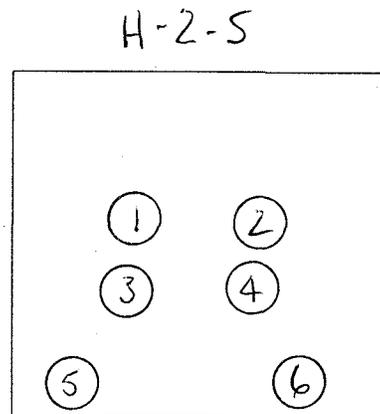
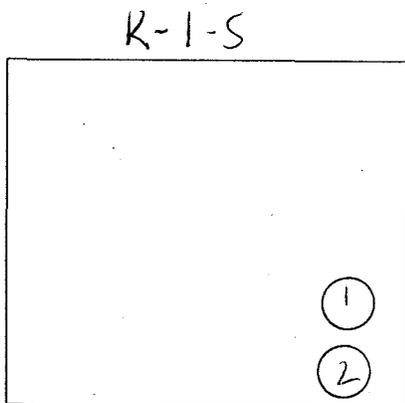
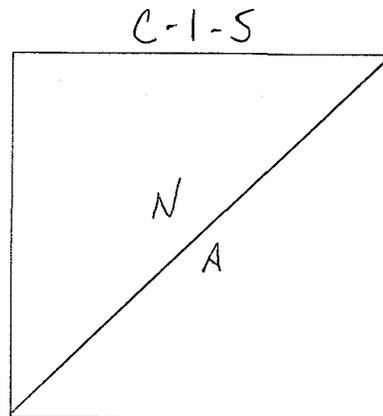
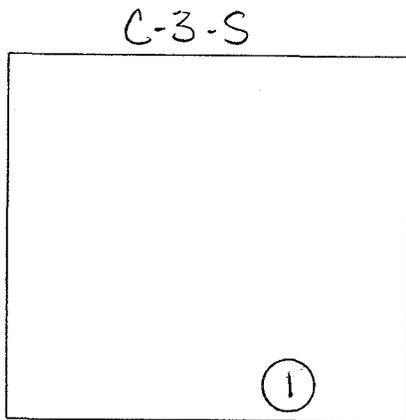
289

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>T903A</u>
Survey Unit Description: <u>EXTERIOR</u>		
RCT Initials/Date: <u>ajf 3/7/00</u>	RCT Initials/Date: <u>ajf</u>	RCT Initials/Date: <u>ajf</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

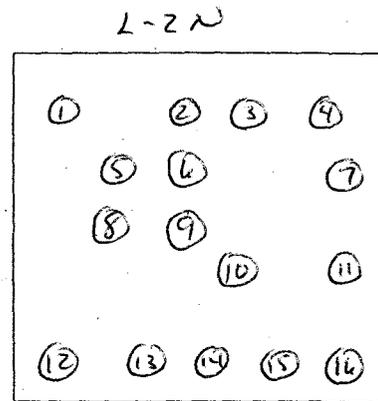
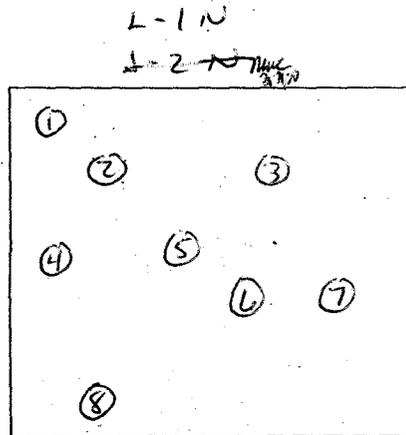
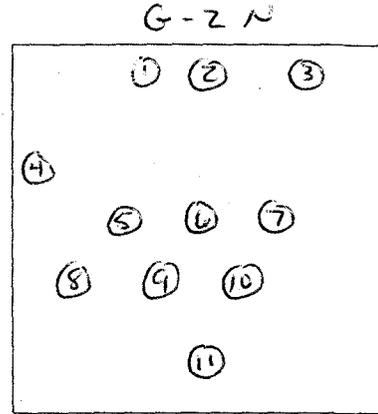
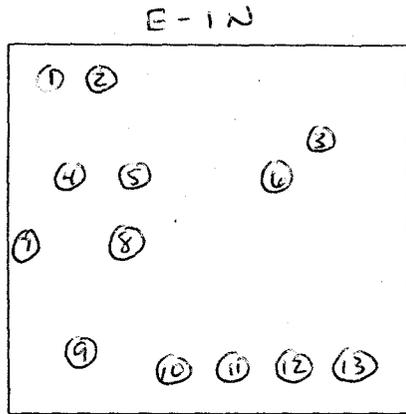
280

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>N/A</i>	Survey Unit: <i>Electra</i>	Building: <i>T 903A</i>
Survey Unit Description: <i>Electra</i>		
RCT Initials/Date: <i>MLC / 3-7-00</i>	RCT Initials/Date: <i>MLC 3-7-00</i>	RCT Initials/Date:

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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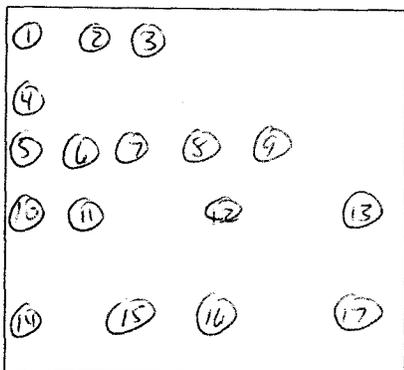
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>TS03A</u>
Survey Unit Description: <u>WALLS</u>		
RCT Initials/Date: <u>ML / 3.7.00</u>	RCT Initials/Date: <u>ML 3.7.00</u>	RCT Initials/Date: <u></u>

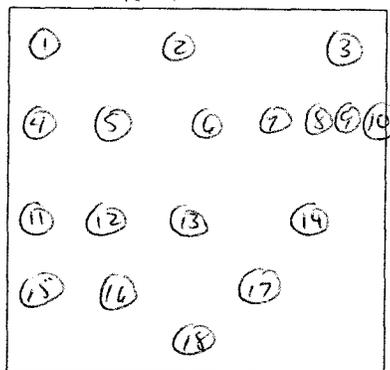
Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**

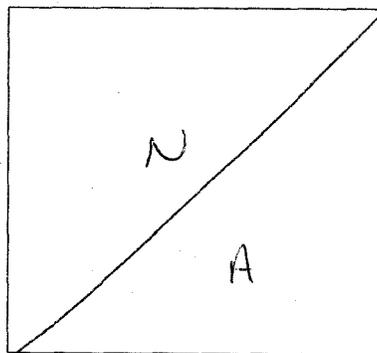
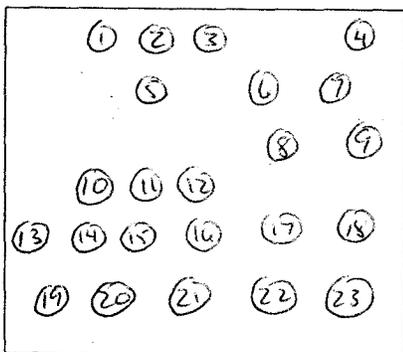
J-2 N



K-1 N



N-2 N



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

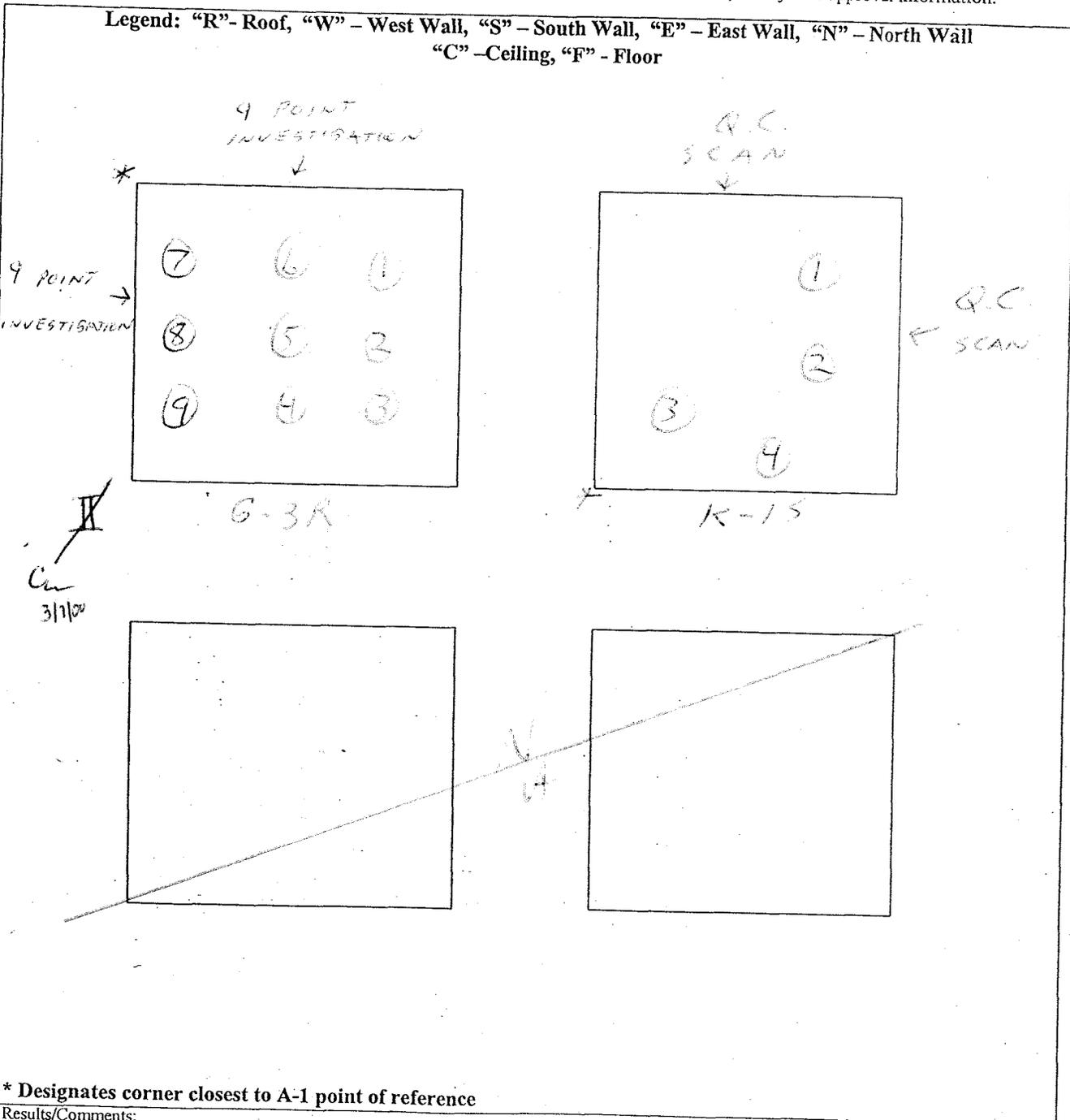
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Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>NA</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>7903A</i>
Survey Unit Description: <i>9 POINT ROOF INVESTIGATION AND SCAN GC'S</i>		
RCT Initials/Date: <i>R 3-2-10</i>	RCT Initials/Date: <i>NA</i>	RCT Initials/Date: <i>NA</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: <u>N/A</u>		Survey Unit: <u>EXTRACUR</u>			Building: <u>PROST</u>				
Survey Unit Description: <u>2nd - 1st Floor PROST</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
A-2E		11	N			11	Y		
C-1E		11	N			11	Y		
C-2E		11	N			11	Y		
C-3S1		11	N			11	Y	5	
C-4S1		11	N			11	Y	10	
C-4S2		11	N			11	Y	12	
H-2S1		11	N			11	Y	8	
H-2S2		11	N			11	Y	10	
H-2S3		11	N			11	Y	9	
H-2S4		11	N			11	Y	6	
H-2S5		11	N			11	Y	8	N
H-2S6		11	N			11	Y	6	N
F-1S1		11	N			11	Y	2	
F-1S2		11	N			11	Y	74	
F-1S3		11	N			11	Y	14	
L-1S1		11	N			11	Y	4 14 300	
L-2S2		11	N			11	Y	14	
L-1S3		11	N			11	Y	16	
I-2S1		11	N			11	Y	14	
I-2S2		11	N			11	Y	12	
I-2S3		11	N			11	Y	10	
J-2S1		11	N			11	Y	12	
J-2S2		11	N			11	Y	6	
J-2S3		11	N			11	Y	14	
E-1N1		12	N			12	Y	12	
E-1N2		12	N			12	Y	12	

294

**Final Survey NE Electra
Scan & Investigation Survey Form
(Continuation Sheet)**

Survey Area:		Survey Unit:			Building:				
NIA		ELECTRA			T905A				
Survey Unit Description:									
Roof - Lines of Transit T905A									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
E-1W3		12	N			12	Y	26	
E-1W4		12	N			12	Y	20	
E-1W5		12	N			12	Y	16	
E-1W6		12	N			12	Y	2	
E-1W7		12	N			12	Y	10	
E-1W8		12	N			12	Y	10	
E-1W9		12	N			12	Y	10	
E-1W10		12	N			12	Y	28	
E-1W11		12	N			12	Y	20	
E-1W12		12	N			12	Y	22	
E-1W13		12	N	N		12	Y	30	N
E-2W1		12	N	N		12	Y	16	N
E-2W2		12	N			12	Y	14	
E-2W3		12	N			12	Y	20	
E-2W4		12	N			12	Y	20	
E-2W5		12	N			12	Y	22	
E-2W6		12	N			12	Y	36	
E-2W7		12	N			12	Y	28	
E-2W8		12	N			12	Y	14	
E-2W9		12	N			12	Y	18	
E-2W10		12	N			12	Y	14	
E-2W11		12	N			12	Y	14	
L-1W1		12	N			12	Y	34	
L-1W2		12	N			12	Y	20	
L-1W3		12	N			12	Y	18	
L-1W4		12	N			12	Y	20	

245

Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>N/A</u>		Survey Unit: <u>EXTERIOR</u>			Building: <u>T905A</u>				
Survey Unit Description: <u>2nd Floor Windows of Truss T905A</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
L-1W5		12	N			12	Y	10	
L-1W6		12	N			12	Y	16	
L-1W7		12	N			12	Y	30	
L-1W8		12	N			12	Y	14	
L-2W1		12	N			12	Y	12	
L-2W2		12	N			12	Y	26	
L-2W3		12	N			12	Y	12	
L-2W4		12	N			12	Y	18	
L-2W5		12	N			12	Y	32	
L-2W6		12	N			12	Y	28	N/A
L-2W7		12	N			12	Y	28	N/A
L-2W8		12	N			12	Y	12	
L-2W9		12	N			12	Y	16	
L-2W10		12	N			12	Y	24	
L-2W11		12	N			12	Y	16	
L-2W12		12	N			12	Y	16	
L-2W13		12	N			12	Y	32	
L-2W14		12	N			12	Y	14	
L-2W15		12	N			12	Y	28	
L-2W16		12	N			12	Y	18	
J-2W1		12	N			12	Y	34	
J-2W2		12	N			12	Y	16	
J-2W3		12	N			12	Y	28	
J-2W4		12	N			12	Y	34	
J-2W5		12	N			12	Y	32	
J-2W6		12	N			12	Y	16	

596

Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>N/A</u>		Survey Unit: <u>EXTENSION</u>			Building: <u>T9034</u>				
Survey Unit Description: <u>Roof + Wharf of Terrace T9034</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
J-207		12	N			12	Y	10	
J-208		12	N			12	Y	8	
J-209		12	N			12	Y	10	
J-210		12	N			12	Y	18	
J-211		12	N			12	Y	26	
J-212		12	N			12	Y	26	
J-213		12	N			12	Y	32	
J-214		12	N			12	Y	16	
J-215		12	N			12	Y	28	
J-216		12	N			12	Y	10	N
J-217		12	N			12	Y	22	N
K-101		12	N			12	Y	34	
K-102		12	N			12	Y	24	
K-103		12	N			12	Y	18	
K-104		12	N			12	Y	26	
K-105		12	N			12	Y	18	
K-106		12	N			12	Y	26	
K-107		12	N			12	Y	24	
K-108		12	N			12	Y	30	
K-109		12	N			12	Y	30	
K-110		12	N			12	Y	30	
K-111		12	N			12	Y	24	
K-112		12	N			12	Y	24	
K-113		12	N			12	Y	18	
K-114		12	N			12	Y	14	
K-115		12	N			12	Y	32	

297

Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>N/A</u>				Survey Unit: <u>EMERICK</u>			Building: <u>1905A</u>		
Survey Unit Description: <u>Boat + Lotus in Terrace (B303A)</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
K-1W6		12	N			12	Y	20	
K-1W7		12	N			12	Y	16	
K-1W8		12	N			12	Y	14	
N-2N 1		12	N			12	Y	31	
N-2N 2		12	N			12	Y	20	
N-2N 3		12	N			12	Y	20	
N-2N 4		12	N			12	Y	34	
N-2N 5		12	N			12	Y	30	
N-2N 6		12	N			12	Y	16	
N-2N 7		12	N			12	Y	32	N
N-2N 8		12	N			12	Y	34	N
N-2N 9		12	N			12	Y	26	
N-2N 10		12	N			12	Y	28	
N-2N 11		12	N			12	Y	14	
N-2N 12		12	N			12	Y	28	
N-2N 13		12	N			12	Y	30	
N-2N 14		12	N			12	Y	30	
N-2N 15		12	N			12	Y	20	
N-2N 16		12	N			12	Y	20	
N-2N 17		12	N			12	Y	28	
N-2N 18		12	N			12	Y	32	
N-2N 19		12	N			12	Y	30	
N-2N 20		12	N			12	Y	28	
N-2N 21		12	N			12	Y	22	
N-2N 22		12	N			12	Y	34	
N-2N 23		12	N			12	Y	34	

298

Final Survey NE Electra Scan & Investigation Survey Form (Continuation Sheet)

Survey Area: <u>U/A</u>				Survey Unit: <u>EXTERIOR</u>			Building: <u>TRCSA</u>		
Survey Unit Description: <u>7-Point and Instrumentation & QC scans</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
<u>G-312</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-313</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-314</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-315</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-316</u>	[REDACTED]	[REDACTED]	<u>N</u>	[REDACTED]	[REDACTED]	[REDACTED]	<u>N</u>	[REDACTED]	[REDACTED]
<u>G-317</u>	[REDACTED]	[REDACTED]	<u>A</u>	[REDACTED]	[REDACTED]	[REDACTED]	<u>A</u>	[REDACTED]	[REDACTED]
<u>G-318</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-319</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>G-320</u>	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
<u>K-151</u>	[REDACTED]	<u>13</u>	<u>N</u>	[REDACTED]	[REDACTED]	<u>13</u>	<u>Y</u>	<u>4</u>	[REDACTED]
<u>K-152</u>	[REDACTED]	<u>13</u>	<u>N</u>	[REDACTED]	[REDACTED]	<u>13</u>	<u>Y</u>	<u>12</u>	[REDACTED]
<u>K-153</u>	[REDACTED]	<u>13</u>	<u>N</u>	[REDACTED]	[REDACTED]	<u>13</u>	<u>Y</u>	<u>10</u>	[REDACTED]
<u>K-154</u>	[REDACTED]	<u>13</u>	<u>N</u>	[REDACTED]	[REDACTED]	<u>13</u>	<u>Y</u>	<u>8</u>	[REDACTED]

Total Avg
186
124
150

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Survey Area: <u>UIA</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>7903-1</u>
Survey Unit Description <u>2nd & 3rd flrs of 7903-1</u>		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
E-1N		7	7	90	90	27	385	10	231	7.3	-104	34	-347
G-2N		7	7	90	90	6.7	372	12	321	11.3	-51	52.6	-170
J-2N		7	7	90	90	3.5	463	10.7	343	5.4	-60	25.1	-200
K-1N		7	7	90	90	5.3	429	8	348	2.7	-81	12.6	-273
L-1N		7	7	90	90	2.7	398	10	307	7.3	-91	34	-304
L-2N		7	7	90	90	4	414	9.3	357	5.3	-63	24.7	-210
N-2N		7	7	90	90	2.7	357	16	345	13.3	-12	61.9	-40
N-3N		7	7	90	90	4.7	377	41	365	39.3	-12	182.9	-40
C-3S		10	10	90	90	14.7	255	13	258	3.3	3	15.7	10
E-3S		10	10	90	90	15.3	233	12	278	-3.3	-5	-15.7	-17
F-1S		10	10	90	90	10	253	13.3	255	5.3	6	25.2	20
H-2S		10	10	90	90	15.3	253	8.7	311	-6.6	58	-31.4	194
I-2S		10	10	90	90	9.3	281	6.7	237	-21.6	3	-13.4	10
J-2S		10	10	90	90	14	283	15.7	233	4.7	-10	22.3	-34
N-3S		10	10	90	90	5.3	255	24.7	313	19.4	28	92.2	94
A-2E		8	8	90	90	6.0	372	21.3	300	15.3	-72	68.5	-231
B-3E		8	8	90	90	7.3	262	32.7	325	25.4	61	113.6	201
C-1E		8	8	90	90	8	303	5.7	273	0.7	-10	3.1	-33
C-2E		8	8	90	90	6	347	7.3	306	1.3	-41	5.0	-135
G-2R		9	9	90	90	7.3	364	31.3	457	24	87	117.3	293
G-3R		9	9	90	90	4.7	463	51.3	477	46.6	72	207.8	242
H-3R		9	9	90	90	14	392	30.7	509	36.7	117	179.4	314
L-3R		9	9	90	90	12.7	435	49.3	482	36.6	47	1175.9	158
M-2R		9	9	90	90	4.7	314	39.3	491	34.6	117	169.1	394
N-2R		9	9	90	90	6.7	396	40	472	33.3	76	162.8	256
O-1R		9	9	90	90	6	381	58	329	52	148	254.2	498
O-2R		9	9	90	90	6.7	357	30	514	43.3	127	211.6	428
O-3R		9	9	90	90	6	418	32.7	480	26.7	62	130.5	209
HEQC		14	14	90	90	2	359	2	313	0	46	0	135
J25QC		14	14	90	90	6	360	0	321	6.7	-3	22.7	-101
I25QC		14	14	90	90	13	321	6	306	4.7	26	23	-74
A25QC		14	14	90	90	13	321	33	341	6	12	29.3	40
M25QC		14	14	90	90	2	301	12	258	10	-63	48.9	-212

Note: Measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

A-2E

301

Survey Area: <i>N/A</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T903A</i>
Survey Unit Description: <i>Roof + Windows of Terrace T903A</i>		

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
E-1N		1	4	0	36.5	0	-5.4	1.5	-21.6
G-2N		2	5	1.5	44.5	0	3.7	1.5	22.5
J-2N		3	6	0	42	0	3.5	0	6.4
K-1N		1	4	0.5	45.5	0	3.6	0	14.4
L-1N		2	5	1	42	0	3.2	0	12.5
L-2N		3	6	0.5	35.5	0	-4.4	0	-17.6
N-2N		1	4	1.5	39.5	1.5	-2.4	3	9.6
N-3N		2	5	3.0	41.5	2.1	2.7	12.6	10.8
O-3S		3	6	0	40	0	0	-2.1	6.4
E-3S		1	4	0	51.5	0	-3.4	-1.5	-1.6
F-1S		2	5	0.5	52.5	0	13.7	-1.2	54.5
H-2S		3	6	0.5	42.5	0	2.6	0	10.4
I-2S		1	4	1.5	40	1.5	-1.9	3.0	27.6
J-2S		2	5	0.5	39	0	6.2	-1.2	0.5
K-3S		3	6	0.5	30.5	0	3.4	0	-13.6
A-2E		1	4	0.5	48	0	6.1	0	24.4
B-3E		2	5	2	40.5	1.1	1.7	3.3	6.5
C-1E		3	6	0.5	40.5	0	6.6	0	6.4
C-2E		1	4	1	38	0	-3.9	1.5	-13.6
C-2R		2	5	0	40	-0.9	1.2	-2.7	4.5
C-3R		3	6	1	37	0.3	-2.9	0.9	-11.6
H-3R		1	4	0.5	49.5	0	7.6	0	30.4
L-3R		2	5	2	46	1.1	7.5	3.3	30.4
M-2R		3	6	1	40.5	0.3	6.6	0.9	2.4
O-1R		1	4	0.5	44	0	21.8	0	6.4
O-2R		2	5	0	36.5	-0.9	-2.5	-2.7	54.2
O-3R		3	6	1.5	41.5	0.8	1.6	2.4	6.4
N-2R		1	4	1	47.5	0.5	5.2	1.5	22.4

302

3-294

Survey Area: NA	Survey Unit: Exterior	Building: T903A
Survey Unit Description North Wall T903A Special		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

M LAWSON			3-10-00
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

Ray Worster			3/11/00
RCT Foreman Printed Name	Employee #	RCT Foreman Signature	Date

303

Survey Area: NA	Survey Unit: Exterior	Building: T903A
Survey Unit Description North Wall FSA's, Special		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6
Serial #						
Cal. Due Date						
Analysis Date						
Instrument Bkg cpm 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time dpm						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	7		8		9		10	11	12
Serial # / Probe #	1395	1368							
Cal. Due Date	7-19-00								
Survey Date	3-10-00								
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	2.7	406						
Alpha Eff (%)	Beta Eff (%)	20.89	28.68						
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	38.5	273.2						

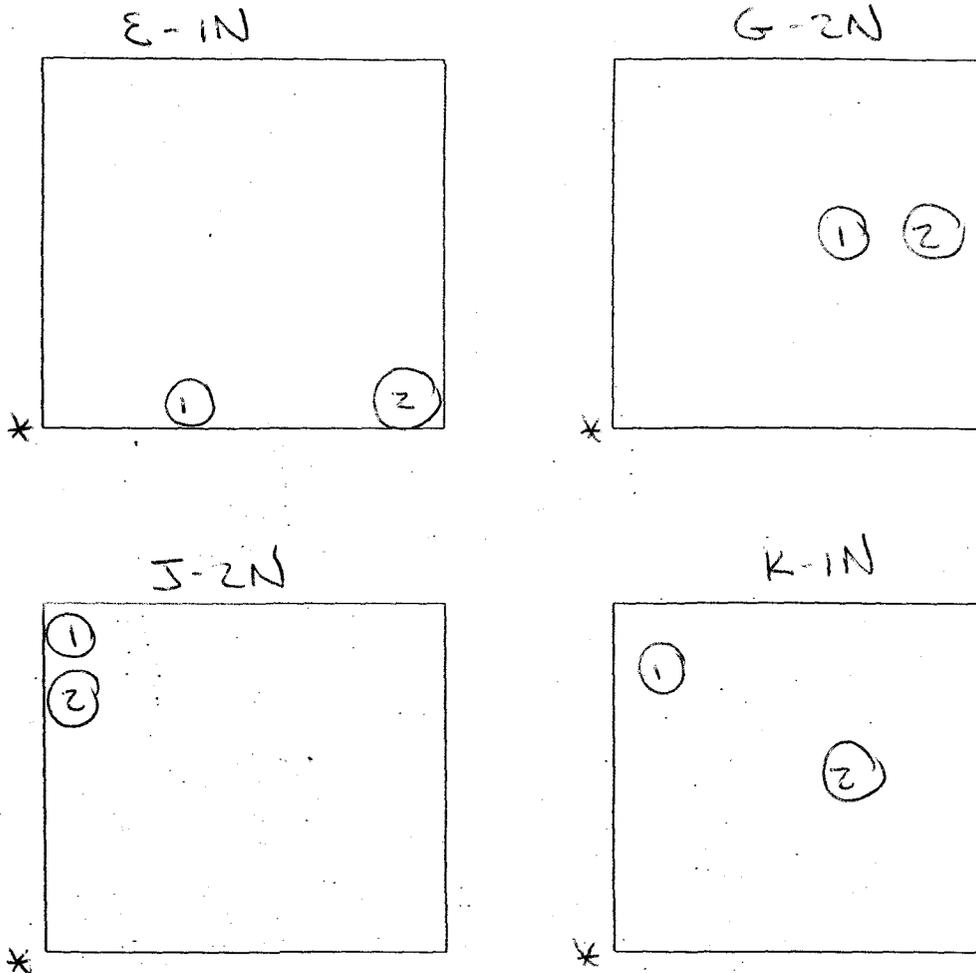
304

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description: North Wall TSA SPECIAL		
RCT Initials/Date: MJ 3-10-00	RCT Initials/Date: N/A	RCT Initials/Date: N/A

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

305

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

3-247

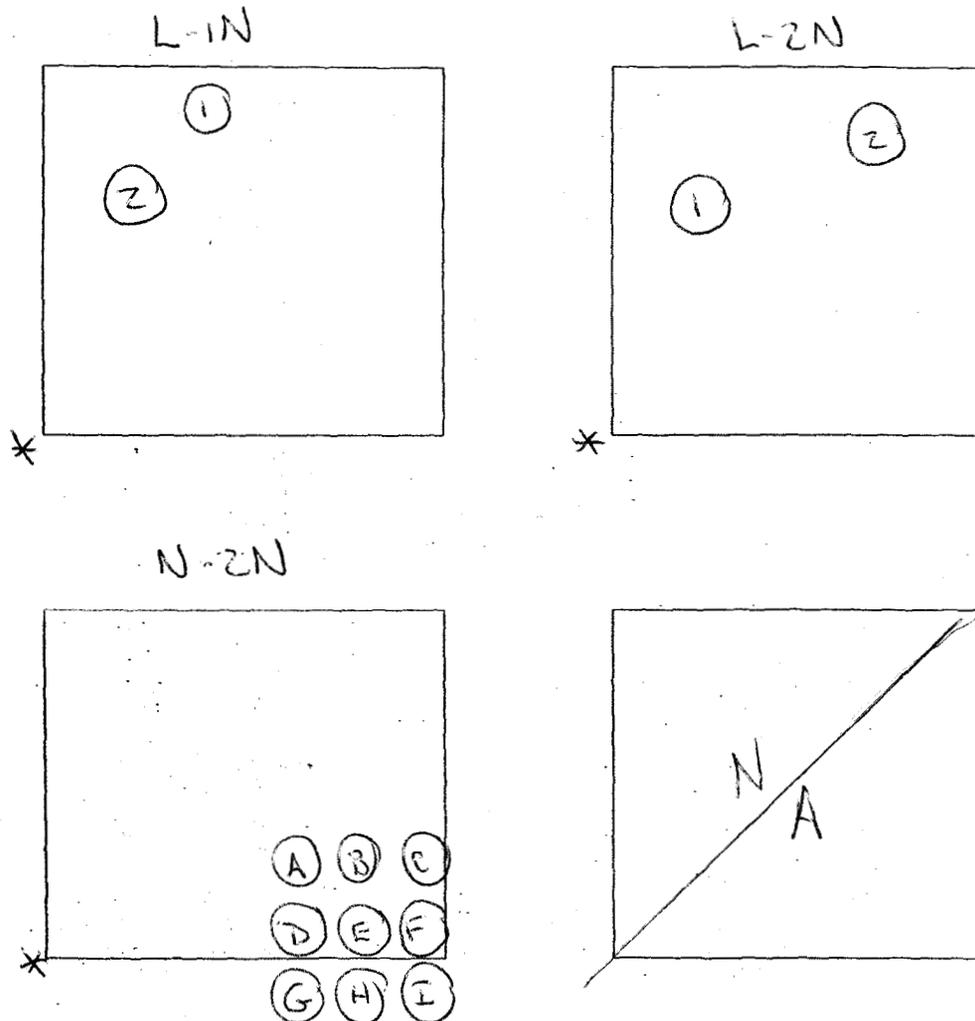
305

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description: North wall TSA's, Special		
RCT Initials/Date: NA 3/10/00	RCT Initials/Date: A	RCT Initials/Date: NA

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

4 of 5

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

3-298

306

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: NA		Survey Unit: EXTERIOR			Building: T903A				
Survey Unit Description: North Wall - FSA² SPECIAL									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm) ^{3/4} 30 sec STATIC	90-sec PAT (dpm/100cm ²)
E-1N1		7	N			7	Y	26.0	111.5
E-1N2		7	N			7	Y	24.0	102.0
G-2N1		7	N			7	Y	27.3	117.8
G-2N2		7	N			7	Y	24.7	105.3
J-2N1		7	N			7	Y	29.3	127.3
S-2N2		7	N			7	Y	24.0	102.0
K-1N1		7	N			7	Y	24.0	102.0
K-1N2		7	N			7	Y	19.3	79.5
L-1N1		7	N			7	Y	30.0	130.7
L-1N2		7	N	NA		7	Y	22.7	95.7
L-2N1		7	N			7	Y	22.7	95.7
L-2N2		7	N			7	Y	20.7	86.2
N-2N1		7	N			7	Y	22.7	95.7
N-2NB		7	N			7	Y	24.0	102.0
N-2NC		7	N			7	Y	18.7	76.6
N-2ND		7	N			7	Y	(1) 33.3	146.5
N-2NE		7	N			7	Y	(1) 34.0	149.8
N-2NF		7	N			7	Y	19.3	79.5
N-2NG		7	N			7	Y	20.7	86.2
N-2NH		7	N			7	Y	16.0	63.7
N-2NI		7	N			7	Y	12.7	47.9
						A			

AVG
94.2

307

(1) Chosen points for this AREA

Sof 3-299

Survey Area: <i>N/A</i>	Survey Unit: <i>TRUCK</i>	Building: <i>T903A</i>
Survey Unit Description <i>Roof & walls of TRUCK T903A (INVESTIGATION)</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>Tom Bineman</i> RCT Printed Name	[REDACTED]	<i>[Signature]</i> RCT Signature	<i>5/10/00</i> Date
<i>N/A</i> RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
<i>N/A</i> RCT Printed Name	<i>N/A</i> Employee #	<i>N/A</i> RCT Signature	<i>N/A</i> Date

Quality Control Measurements Performed By

<i>N/A</i> RCT Printed Name	[REDACTED]	<i>N/A</i> RCT Signature	<i>N/A</i> Date
RCT Printed Name	[REDACTED]	RCT Signature	Date
RCT Printed Name	[REDACTED]	RCT Signature	Date
<i>N/A</i> RCT Printed Name	[REDACTED]	<i>N/A</i> RCT Signature	<i>N/A</i> Date

Survey Reviewed By

<i>Bob Worsen</i> RCT Foreman Printed Name	[REDACTED]	<i>[Signature]</i> RCT Foreman Signature	<i>6-6-00</i> Date
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308

Survey Area: N/A	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description		
ROOF AND WALLS OF TRAILER T903A. (INVESTIGATION).		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE				
Model	SAC-4	BC-4				
Inst. ID #	1	2	3	4	5	6
Serial #	823	966				
Cal. Due Date	9/6/00	9/15/00				
Analysis Date	5/24/00	5/24/00				
Instrument Bkg. <i>cpm</i> 10-min count time	0.5	40.9				
Instrument Eff (%)	33	25				
Instrument MDA <i>dpm</i> 1-min count time	15.6	70.6	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.							
Model	Electra		Electra		Electra							
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2385	1931										
Cal. Due Date	6/14/00											
Survey Date	5/24/00											
Alpha Bkg 90-sec <i>cpm</i> count time	Beta Bkg 90- sec count time <i>cpm</i>											
Alpha Eff (%)	Beta Eff (%)		1.3	400								
Alpha MDA 90-sec <i>dpm</i> count time	Beta MDA 90-sec <i>dpm</i> count time		21.3	29.49								
	37.6	325	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

309

Survey Area: NA	Survey Unit:	Building: 79851
Survey Unit Description Katy Sample Location and Well		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

MARK LAWSON			3/28/00
RCT Printed Name		RCT Signature	Date
Tom Brinham			3-28-00
RCT Printed Name		RCT Signature	Date
Archie Parker			3-28-00
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

SCORNON			3-29-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

312

Survey Area: NA	Survey Unit: Exterior	Building: T903A
Survey Unit Description		
Roof and Wall Sample Location		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE	EBERLINE	EBERLINE		
Model	SAC4	BC4	SAC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	823	966	1171	868		
Cal. Due Date	9/6/00	9/15/00	7/11/00	7/12/00		
Analysis Date	3/29/00	3/29/00	3/29/00	3/29/00		
Instrument Bkg. ^{cpm} 10-min count time	0.5	38.1	0.6	38.8		
Instrument Eff (%)	33	25	33	25		
Instrument MDA ^{dpm} 2-min count time	9.6	68.3	10.1	68.9	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		N.E. Tech.			
Model	Electra		Electra		Electra		Electra			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	2374	1919	2376	1921						
Cal. Due Date	9/8/00		8/23/00							
Survey Date	3/28/00		3/28/00							
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90 sec count time ^{cpm}	4.7	406	3.3	407					
Alpha Eff (%)	Beta Eff (%)	20.85	29.89	20.46	29.7					
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	48.2	262	42.6	264	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

313

Survey Area: NA	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description Roof and Wall Sample Location		

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		Gross Count (gcpm)		LAB (cpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
PRE				90	90					0.0	0	0.0	0
N-2N		7	7	90	90	16.0	330	4.0	380	12.0	-50	57.6	-167
POST				90	90					0.0	0	0.0	0
N-2N		7	7	90	90	20.0	335	5.3	409	14.7	-74	70.5	-248
PRE				90	90					0.0	0	0.0	0
N-2NQC		8	8	90	90	29.3	329	2.7	305	26.6	24	130.0	81
POST				90	90					0.0	0	0.0	0
N-2NQC		8	8	90	90	17.3	318	3.3	418	14.0	-100	68.4	-337
PRE				90	90					0.0	0	0.0	0
L-1N		8	8	90	90	7.3	293	3.3	323	4.0	-30	19.6	-101
POST				90	90					0.0	0	0.0	0
L-1N		8	8	90	90	9.3	273	3.3	313	6.0	-40	29.3	-135
PRE				90	90					0.0	0	0.0	0
G-3R		7	7	90	90	51.3	468	3.3	383	48.0	85	230.2	284
POST				90	90					0.0	0	0.0	0
G-3R		7	7	90	90	38.7	449	5.3	357	33.4	92	160.2	308
PRE				90	90					0.0	0	0.0	0
G-3RQC		8	8	90	90	35.3	428	2.0	441	33.3	-13	162.8	-44
POST				90	90					0.0	0	0.0	0
G-3RQC		8	8	90	90	28.0	444	2.7	393	25.3	51	123.7	172
PRE				90	90					0.0	0	0.0	0
O-1R		7	7	90	90	60.7	508	2.0	381	58.7	127	281.5	425
POST				90	90					0.0	0	0.0	0
O-1R		7	7	90	90	38.0	465	7.3	384	30.7	81	147.2	271
				90	90					0.0	0	0.0	0
				90	90					0.0	0	0.0	0
				90	90					0.0	0	0.0	0
				90	90					0.0	0	0.0	0
QC				90	90					0.0	0	0.0	0
QC				90	90					0.0	0	0.0	0
QC				90	90					0.0	0	0.0	0
QC				90	90					0.0	0	0.0	0
QC				90	90					0.0	0	0.0	0

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

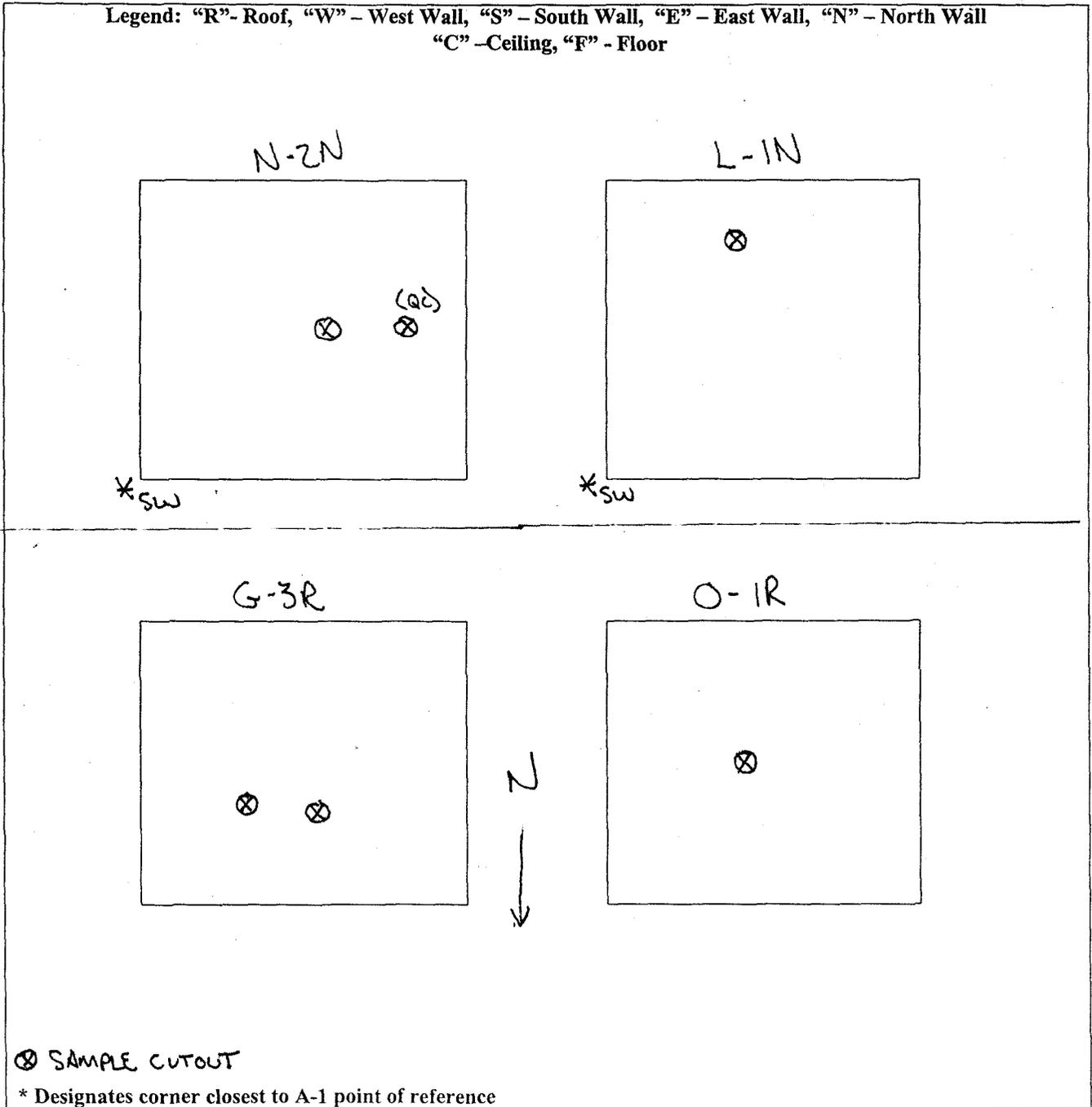
214

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: T903A
Survey Unit Description: Roof ^{AND wall} Sample Location		
RCT Initials/Date: MA 3/29/00	RCT Initials/Date: NA	RCT Initials/Date: NA

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T331A	
Survey Area: Not Applicable		Survey Unit: Interior	
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.			
Building Information: Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/> Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/> Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls: Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS	[Redacted]	[Signature]	[Date]
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE	[Redacted]	N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[Redacted]	[Signature]	[Date]
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS	[Redacted]	[Signature]	[Date]
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date
NOT APPLICABLE	[Redacted]	N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[Redacted]	[Signature]	[Date]
RESS Manager Printed Name		RESS Manager Signature	Date

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T331A		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior		Area (m ²): 177	
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T331A
Survey Area: Not Applicable		Survey Unit: Interior
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	<p>INTERIOR FLOORS/WALLS/CEILINGS: 28 surveys will be taken per the attached survey map.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
	<p style="text-align: center;"><u>QUALITY ASSURANCE SURVEYS</u></p> <p>INTERIOR FLOORS/WALLS/CEILINGS: 5 surveys will be taken per direction from radiological engineering.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T331A
Survey Area: Not Applicable		Survey Unit: Interior
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
<p>Surface Scanning</p> <p><i>Change #2 KMM 7-11-00</i></p>	<p>INTERIOR FLOORS: Biased surface scans will be performed on the interior floors in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring.</p> <p>No ^{KSS} more than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u> INTERIOR FLOORS: 5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
<input checked="" type="checkbox"/> Total Surface Activity <input type="checkbox"/> Media Surface Activity	
<input checked="" type="checkbox"/> Removable Surface Activity <input type="checkbox"/> Volumetric Surface Activity	
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>	
RICK ROBERTS	
Project RE Printed Name	Project RE Signature
H.B. ESTABROOKS	
RESS RE Printed Name	RESS RE Signature
	Date

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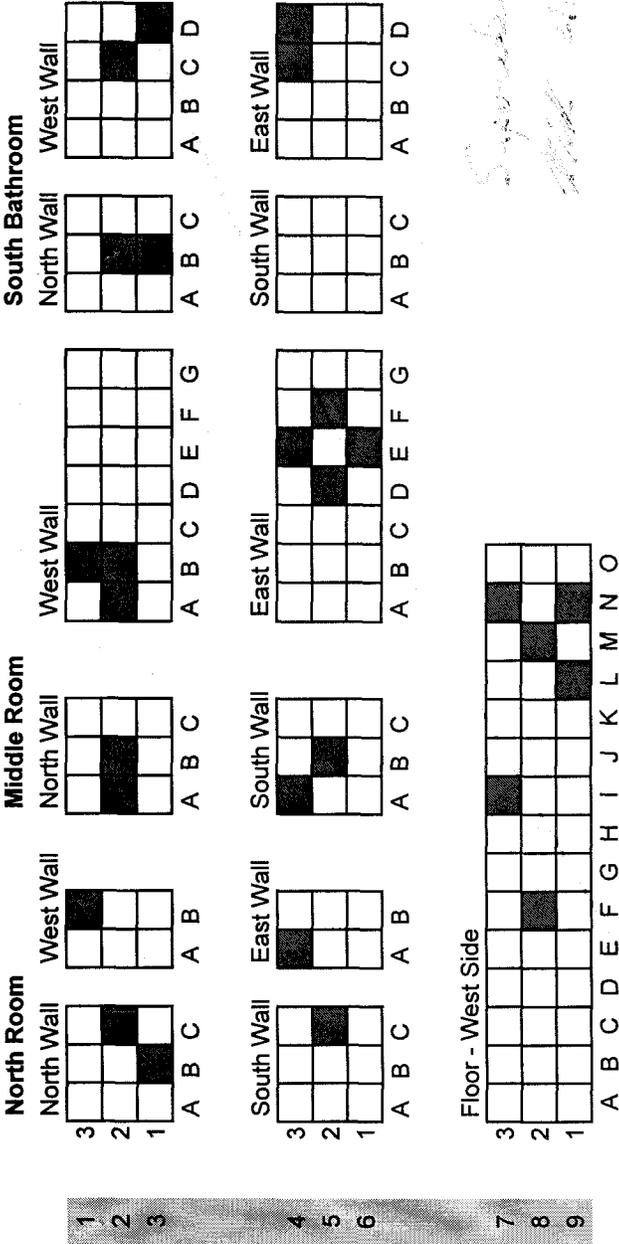
328

SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Interior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
Floor Area (m²): 45	Total Area (m²): 177
SEE ATTACHED SURVEY MAP	

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T331A Interior



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X-Coordinate	Y-Coordinate
2	2

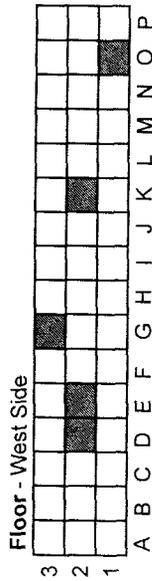
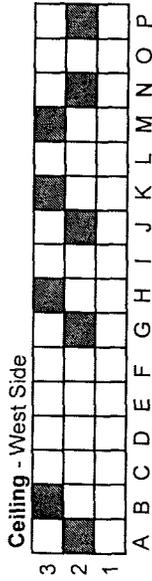
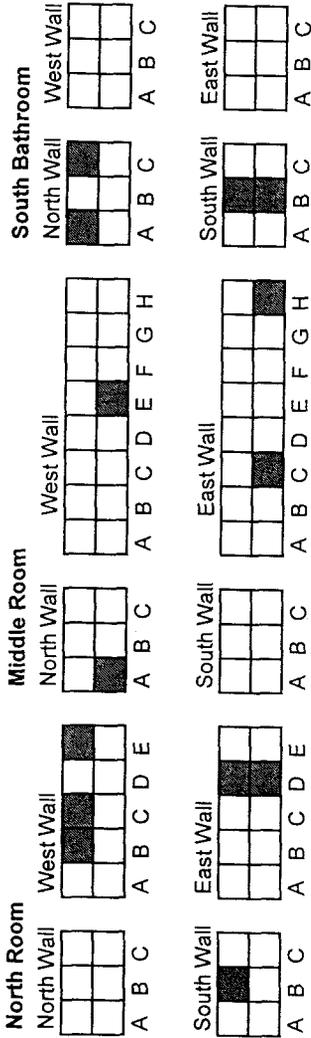
☐ = one square meter
 ■ = direct & swipe

1	2	3	11	10	2	21	12	9	X	Y
2	9	2	12	9	4	22	14	7	X	Y
3	14	2	13	6	1	23	22	3	X	Y
4	27	4	14	15	2	24	3	5	X	Y
5	3	2	15	26	2	25	18	6	X	Y
6	13	8	16	22	2	26	15	1	X	Y
7	5	4	17	14	9	27	10	5	X	Y
8	19	5	18	26	4	28	27	3	X	Y
9	6	8	19	18	4				X	Y
10	9	7	20	17	5				X	Y

Total Surface Area = 177 m²
 10% Scan Surface Area = 18 m²

330

T331A Interior



X-Coordinate	Y-Coordinate
28	4

☐ = one square meter
 ■ = direct & swipe

X	Y	X	Y	X	Y
1	24	4	11	19	2
2	7	1	12	4	9
3	8	3	13	11	9
4	22	4	14	8	4
5	2	3	15	10	6
6	2	5	16	5	9
7	25	1	17	1	6
8	17	4	18	7	6
9	8	5	19	14	6
10	11	2	20	11	5

Total Surface Area = 196 m²
 10% Scan Surface Area = 19.6 m²

(09/30/99)

APPENDIX A

Page 1 of 1

DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KDM / 6-2-00	
7.1[1]	DQOs implemented as prescribed	KDM / 6-2-00	
7.1[2]	All required supporting documents present	KDM / 6-2-00	
7.1[3]	Outliers / anomalies addressed	KDM / 6-2-00	
7.2	Data Validation	KDM / 6-2-00	
7.2.1	Survey/Sample Precision	KDM / 6-2-00	see spreadsheets
7.2.2	Survey Accuracy	KDM / 6-2-00	
	Sample Accuracy	N/A	no samples taken
7.2.3	Data Representative of survey unit	KDM / 6-2-00	yes
7.2.4	Survey/Sample/Scan Completeness	KDM / 6-2-00	100%
7.2.5	Data Comparable to related units	KDM / 6-2-00	yes, Group B
7.3	DQA complete	KDM / 6-2-00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	N/A	
7.3[4]	Mean > DCGL _w	N/A	
7.3.[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	6/13/00	none
	Package submitted to project management		
9.1	Records to Records Center (copy to project files)	KDM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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3-325

Survey Area: N/A
Survey Unit: Interior
Building: T331A
Survey Unit Description: Walls, floors and ceiling of T331A

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. O. [Signature] 6/2/00

**Removable Activity
(dpm/100 cm²) Alpha**

3.0
-1.5
0.0
0.0
0.0
0.0
0.0
-1.5
0.0
0.0
0.0
0.0
0.0
0.0
-1.5
-1.5
-1.5
0.0
-1.5
4.5
0.0
4.5
0.0
0.0
0.0
0.0
0.0
0.0

Survey Area - N/A
Survey Unit - Interior
Building - T331A
Survey Unit Description - Walls, ceiling and floor of Trailer T331A
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 0.1 dpm/100 cm²
Std Dev 1.6 dpm/100 cm²

No measurement exceeds the DCGL_w

**Removable Activity
(dpm/100 cm²) Beta**

8.4
-12.8
14.4
-22.8
-17.6
15.2
-7.6
-16.8
-9.6
-0.8
14.4
34.4
-10.8
-32.8
-7.6
-2.8
5.2
2.4
8.4
-0.8
-9.6
29.2
12.4
-0.8
12.4
3.2
46.4
2.4

Survey Area - N/A
Survey Unit - Interior
Building - T331A
Survey Unit Description - Walls, ceiling and floor of Trailer T331A
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean 2.0 dpm/100 cm²
Std Dev 17.2 dpm/100 cm²

No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

-6.4
6.4
0.0
-16.6
6.4
3.4
0.0
0.0
6.4
12.9
9.6
12.9
12.9
2.9
-6.2
79.9
12.9
-9.6
12.4
15.8
3.4
6.7
6.2
2.9
19.6
6.4
-2.9
12.9

Survey Area - N/A
Survey Unit - Interior
Building - T331A
Survey Unit Description - Walls, ceiling and floor of Trailer T331A

Total Surface Activity Data Sheet

DCGL_w 100 dpm/100 cm²

n 28

Mean 7.5 dpm/100 cm²

Std Dev 16.4 dpm/100 cm²

No measurement exceeds the DCGL_w

No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
O-1F	2.9	19.1	-16.2	11	-147.2727
G-3F	12.9	-3.4	16.3	4.75	343.1579
D-2F	12.9	9.6	3.3	11.25	29.33333
E-2F	9.6	-6.2	15.8	1.7	929.4118
K-2F	12.9	6.2	6.7	9.55	70.15707

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$$

$$\Delta/\sigma_s = (100-50)/16.4$$

$$\Delta/\sigma_s = 3.05 \text{ (default to 3.0)}$$

$$\text{Sign } p = 0.998650$$

$$N = 10.88$$

$$10.88 * 1.2 = 13.06$$

$$N = 14$$

**Total Surface Activity
(dpm/100 cm²) Beta**

-71
114
54
125
47
-13
64
77
10
-157
17
52
-24
14
-411
-70
-108
-77
21
-356
-234
49
-3
-56
-182
-458
-481
-258

Survey Area - N/A
Survey Unit - Interior
Building - T331A
Survey Unit Description - Walls, ceiling and floor of Trailer T331A

Total Surface Activity Data Sheet

DCGL_w 5000 dpm/100 cm²

n 28

Mean -82.7 dpm/100 cm²

Std Dev 172.8 dpm/100 cm²

No measurement exceeds the DCGL_w

No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
O-1F	14	38	-24	26	-92.30769
G-3F	52	146	-94	99	-94.94949
D-2F	-157	-52	-105	-104.5	0
E-2F	17	7	10	12	83.33333
K-2F	-24	91	-115	33.5	-343.2836

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$$

$$\Delta/\sigma_s = (5000-2500)/172.8$$

$$\Delta/\sigma_s = 14.47 \text{ (default to 3)}$$

$$\text{Sign } p = 0.998650$$

$$N = 10.88$$

$$10.88 * 1.2 = 13.05$$

$$N = 14$$

Survey Area: NA	Survey Unit: INTERIOR	Building: T331A
Survey Unit Description WALLS, FLOOR, CEILING		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

M LAWSON			3-11-00
RCT Printed Name		RCT Signature	Date
A PARKER			3-11-00
RCT Printed Name		RCT Signature	Date
R KELLEY			3-11-00
RCT Printed Name		RCT Signature	Date
	Employee #	RCT Signature	Date
	N	A	
	Employee #	RCT Signature	Date
		RCT Signature	Date
		RCT Signature	Date

Quality Control Measurements Performed By

A. PARKER			3-11-00
RCT Printed Name		RCT Signature	Date
	Employee #	RCT Signature	Date
	N	A	
	Employee #	RCT Signature	Date
		RCT Signature	Date
		RCT Signature	Date

Survey Reviewed By

Kow W...			3-13-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: NA	Survey Unit: Interior	Building: T331A
Survey Unit Description WALLS, Floor, Ceiling		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	Eberline	Eberline	Eberline	Eberline		
Model	SAC4	SAC4	BC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	1170	961	928	961		
Cal. Due Date	6-30-00	6-21-00	3-27-00	6-27-00		
Analysis Date	3-11-00	3-11-00	3-11-00	3-11-00		
Instrument Bkg ^{cpm} 10-min count time	0.5	0.5	40.9	38.7		
Instrument Eff (%)	33	33	25	25		
Instrument MDA 2-min count time _{dpm}	9.6	9.6	70.6	68.8		

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.					
Model	Electra		Electra		Electra					
Inst. ID #	7		8		9		10	11	12	
Serial # / Probe #	1395	1368	2376	1921						
Cal. Due Date	7-19-00		8-23-00							
Survey Date	3-11-00		3-11-00							
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90-sec ^{cpm} count time	2.0	326	2.7	336					
Alpha Eff (%)	Beta Eff (%)	20.89	28.68	20.46	29.70					
Alpha MDA 90-sec _{dpm} count time	Beta MDA 90-sec _{dpm} count time	34.4	245.5	59.3	240.5					

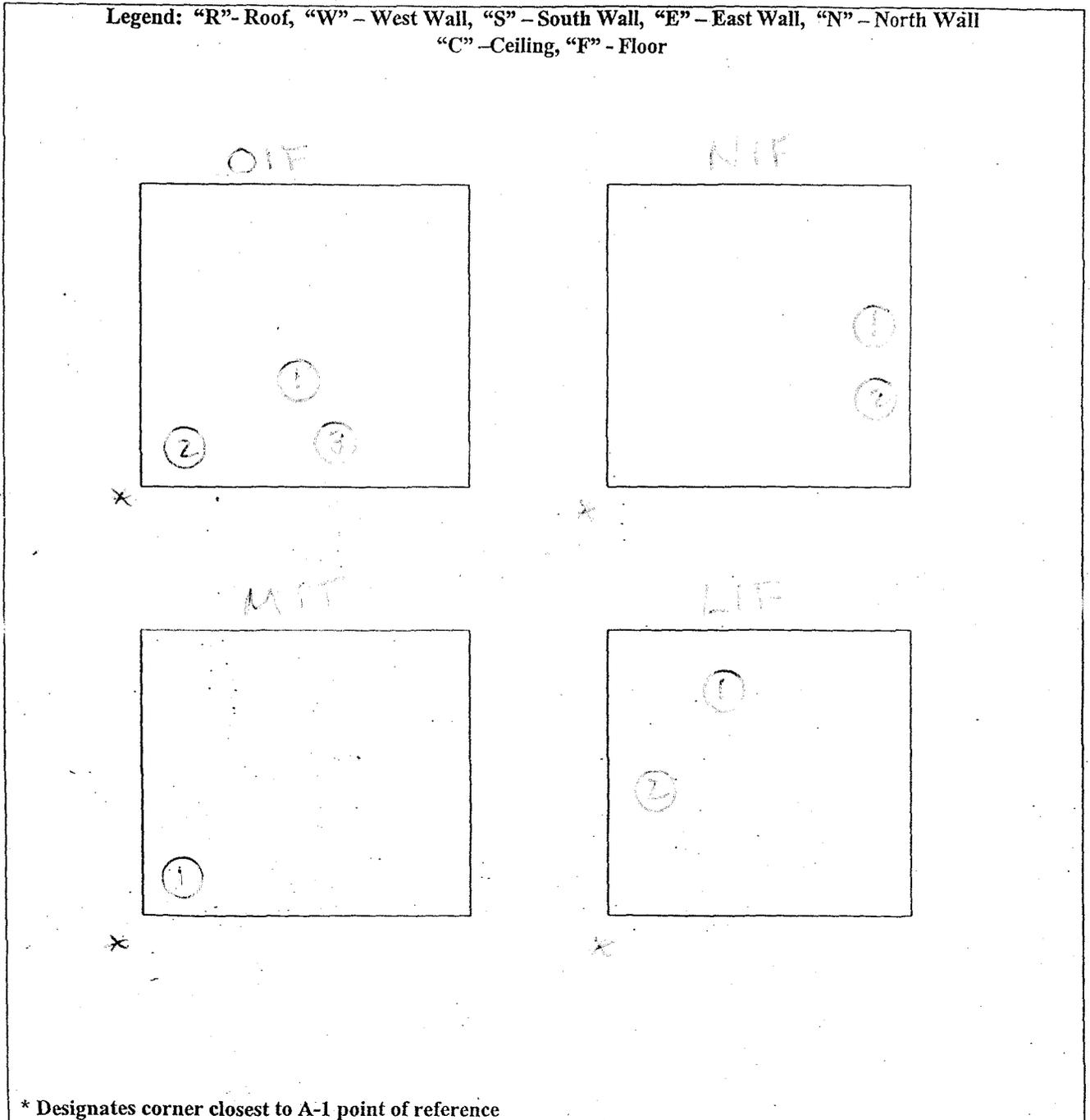
340

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>2/A</u>	Survey Unit: <u>INTERIOR</u>	Building: <u>1231A</u>
Survey Unit Description: <u>INTERIOR</u>		
RCT Initials/Date: <u>RF 3/11/00</u>	RCT Initials/Date: <u>RF 3/11/00</u>	RCT Initials/Date: <u>RF</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

312

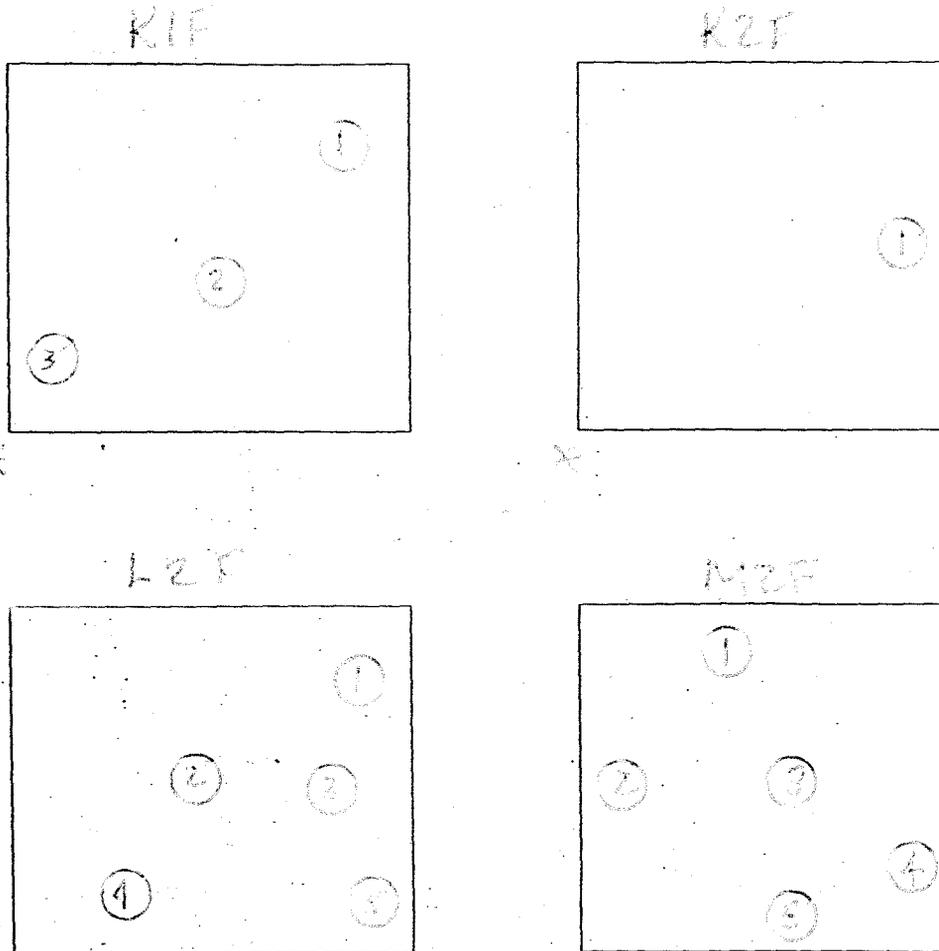
3-334

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>NA</u>	Survey Unit: <u>3rd Floor</u>	Building: <u>133A</u>
Survey Unit Description: <u>3rd Floor</u>		
RCT Initials/Date: <u>NA 3/11/00</u>	RCT Initials/Date: <u>MC 3-11-00</u>	RCT Initials/Date: <u>NA</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" – West Wall, "S" – South Wall, "E" – East Wall, "N" – North Wall
"C" –Ceiling, "F" – Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

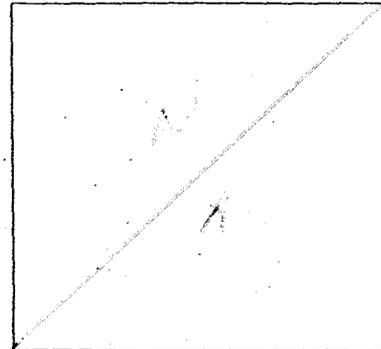
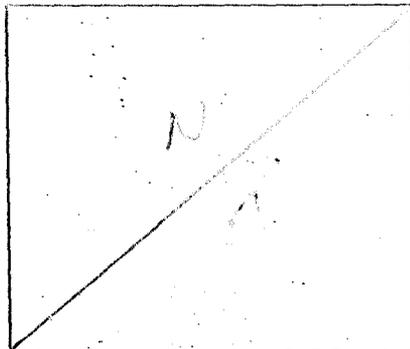
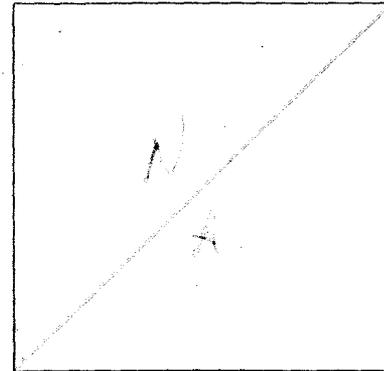
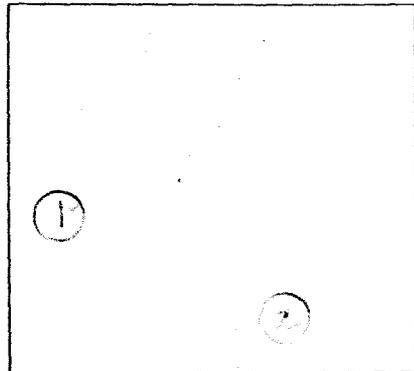
343

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/K</u>	Survey Unit: <u>INTERIOR</u>	Building: <u>T3311</u>
Survey Unit Description: <u>INTERIOR</u>		
RCT Initials/Date: <u>RF 3/1/00</u>	RCT Initials/Date: <u>MS 3-1-00</u>	RCT Initials/Date: <u>VA</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: NA		Survey Unit: INTERIOR			Building: T331A				
Survey Unit Description: WALLS, FLOOR SCAN									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
D-2F		7	N	NA 3110		8	N	NA	
D-3F		7	N			8	N	NA	
E-2F		7	N			8	N	NA	
F-2F		7	N			8	N	NA	
G-2F		7	N			8	N	NA	
G-3F		7	N			8	N	NA	
H-2F		7	N			8	N	NA	
H-3F		7	N			8	N	NA	
I-2F		7	N			8	N	NA	
J-1F		7	N			8	N	NA	
J-2F		7	N			8	N	NA	
K-1F1		8	N	NA		8	Y	6	NA
K-1F2		8	N			8	Y	8	
K-1F3		8	N			8	Y	8	
K-2F1		8	N			8	Y	4	
L-1F1		8	N			8	Y	4	
L-1F2		8	N			8	Y	4	
L-2F1		8	N			8	Y	14	
L-2F2		8	N			8	Y	2	
L-2F3		8	N			8	Y	4	
L-2F4		8	N			8	Y	6	
L-2F5		8	N			8	Y	22	
M-1F1		8	N			8	Y	4	
M-2F1		8	N			8	Y	4	
M-2F2		8	N			8	Y	12	
M-2F3		8	N			8	Y	4	

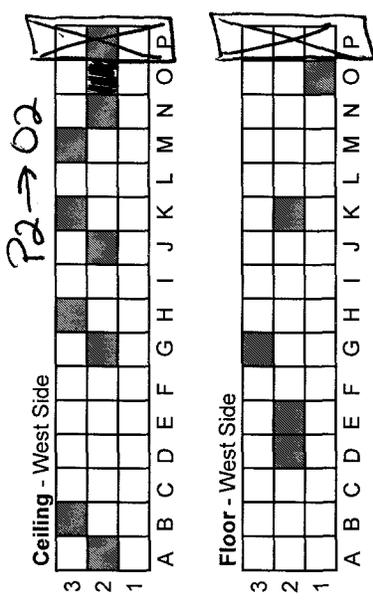
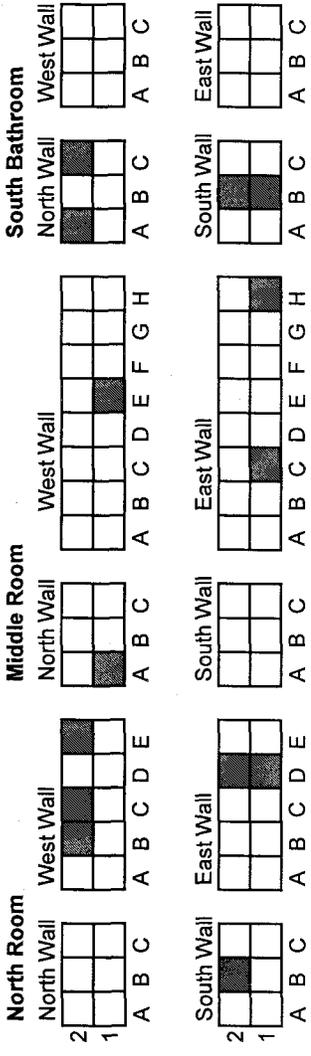
345

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: NA		Survey Unit: INTERIOR			Building: T331A				
Survey Unit Description: FLOOR SCANS									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
MZF4		8	N	NA		8	Y	4	NA
M-ZF5		8	N	NA		8	Y	8	NA
N-1F1		8	N	NA		8	Y	4	NA
N-1F2		8	N	NA		8	Y	6	NA
N-2F		8	N	NA		8	N	NA	NA
O-1F1		8	N	NA		8	Y	4	NA
O-1F2		8	N	NA		8	Y	4	NA
O-1F3		8	N	NA		8	Y	10	NA
QC									
J-1F		7	N	NA		7	N	NA	NA
J-2F		7	N	NA		7	N	NA	NA
NA									

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T331A Interior



'P' COLUMNS DO NOT EXIST.
 - HAVE THEM REMOVED
 MEASUREMENT REGION
 MATCH AS per 10/10/10



X-Coordinate	Y-Coordinate
28	4

□ = one square meter
 ■ = direct & swipe

1	24	4	11	19	2	21	23	1
2	7	1	12	4	9	22	13	5
3	8	3	13	11	9	23	15	10
4	22	4	14	8	4	24	24	3
5	2	3	15	10	6	25	16	6
6	2	5	16	5	9	26	7	8
7	25	1	17	1	6	27	6	1
8	17	4	18	7	6	28	9	1
9	8	5	19	14	6			
10	11	2	20	11	5			

Total Surface Area = 196 m²
 10% Scan Surface Area = 19.6 m²

Survey Area: NA	Survey Unit: INT	Building: T331A
Survey Unit Description Walls, Floor, Ceiling		

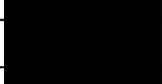
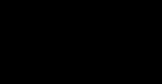
Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β	α	β	α	β
MAIN A-2C		8	8	90	90	3.3	468	2.0	447	-1.3	-21	-6.4	-71
B-3C		8	8	90	90	0.0	431	1.3	465	1.3	34	6.4	114
G-2C		8	8	90	90	1.3	449	1.3	465	0	16	0	54
H-3C		8	8	90	90	4.7	430	1.3	467	-3.4	37	-16.6	125
J-2C		8	8	90	90	2.7	464	4.0	478	1.3	14	6.4	47
K-3C		8	8	90	90	0.0	477	0.7	473	0.7	-4	3.4	-13
M-3C		8	8	90	90	1.3	473	1.3	492	0	+19	0	64
N-2C		8	8	90	90	1.3	478	1.3	501	0	+23 ^{gross} / ₂₅	0	447 ^{gross}
O-2C		8	8	90	90	0.0	474	1.3	477	1.3	3	6.4	10
D-2F		7	7	90	90	2.0	436	4.7	391	2.7	-45	12.9	-157
E-2F		7	7	90	90	2.7	427	4.7	432	2.0	5	9.6	17
G-3F		7	7	90	90	2.0	397	4.7	412	2.7	15	12.9	52
K-2F		7	7	90	90	2.0	412	4.7	405	2.7	-7	12.9	-24
O-1F		7	7	90	90	2.7	430	3.3	434	0.6	4	2.9	14
V. ROOM B-2W		7	7	90	90	3.3	560 ³⁸⁰	2.0	262	-1.3	-118	6.2 ^{6.2}	411 ⁴¹¹
C-2W		7	7	90	90	3.3	380 ³⁸⁰	20.0	360	16.7	+20	79.9	70 ⁷⁰
E-2W		7	7	90	90	1.3	410	4.0	379	2.7	-31	12.9	-108
B-2S		7	7	90	90	4.0	377	2.0	355	-2.0	-22	-9.6	-77
D-1E		7	7	90	90	2.7	353	5.3	359	2.6	6	12.4	21
D-2E		7	7	90	90	2.7	410 ⁴¹⁰	6.0	308	3.3	-102	15.8	-356
MIDDLE A-1N		7	7	90	90	3.3	360	4.0	293	0.7	-67	3.4	-234
E-1W		7	7	90	90	3.3	341	4.7	355	1.4	14	6.7	49
C-1E		7	7	90	90	2.0	312	3.3	311	1.3	-1	6.2	3.5 ³
H-1E		7	7	90	90	2.7	346	3.3	330	0.6	-16	2.9	-56
S. BAH A-2N		8	8	90	90	0.0	350	4.0	296	4.0	-54	44.6 ^{44.6}	-182
C-2N		8	8	90	90	2.0	409	3.3	273	1.3	-136	6.2 ^{6.2}	-458
B-1S		7	7	90	90	5.3	423	4.7	285	-0.6	+138	-2.9	-481
B-2S		7	7	90	90	1.3	368	4.0	294	2.7	-74	12.9	-258
O-1FQC		7	7	90	90	5.3	358	9.3	367	4.0	11	19.1	38
G-3FQC		7	7	90	90	6.0	351	5.3	393	-0.7	42	-3.4	146
D-2FQC		7	7	90	90	7.3	354	9.3	339	2.0	-15	9.6	-52
E-2FQC		7	7	90	90	5.3	373	4.0	371	-1.3	-2	-6.2	22.70 ^{22.70}
K-2FQC		7	7	90	90	2.7	371	4.0	365	1.3	-26	6.2	22.70 ^{22.70}

Note: Measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" local area background.

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: T331A	
Survey Area: Not Applicable		Survey Unit: Exterior	
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.			
Building Information: Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/> Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/> Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/> Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls: Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS			
Radiological Engineer Printed Name		Radiological Engineer Signature	Date 1/28/00
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS			
RESS Manager Printed Name		RESS Manager Signature	Date 8/14/00
Survey Package Closure:			
RICK ROBERTS ERIC D. McNAMEY			
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date 8/14/00
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS J. W. Mahaffey			
RESS Manager Printed Name		RESS Manager Signature	Date 8-14-00

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: T331A	
Survey Area: Not Applicable		Survey Unit: Exterior	
Change #	Description	Initiator/ Date	PRE
1	a) Incorporate requirements of Letter RSR-003-00 dated 2/8/00 (See p. 2 of 2)	MM 2/11/00	MM
	b) Incorporate requirements of Letter RSR-003-00 dated 2/9/00 (See p. 2 of 2)		
	c.) Incorporate revision to survey map. Square meters delimited area with dimensions of 2.25 meters		
	d.) 50% of area survey shall be on this roof.		
2	Perform roof survey/sampling per Letter RSR-003-00 dated 3/4/00 (See p. 8h of 242)	MM 3/15/00	MM
3	2 samples & 1 Qc sample required per Characterization Package Supplement for Sampling and Analysis of Roofing Material from Groups B & C for Isotopic Analysis	EDM 4/1/00	J
4	Corrected scan requirement	EDM 7/1/00	J

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: T331A		Type: 1	
Survey Area: Not Applicable		Survey Unit: Exterior		Area (m ²): 153	
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	2 2	0	Biased
Building:		Type: <i>Change # 3 4/1/00</i>		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans

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3-335 ^{09/11/00}
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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: T331A
Survey Area: Not Applicable		Survey Unit: Exterior
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	<p>EXTERIOR WALLS/ROOF: 28 surveys will be taken per the attached survey map.</p> <p><u>QUALITY ASSURANCE SURVEYS</u></p> <p>EXTERIOR WALLS/ROOF: 5 surveys will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: T331A
Survey Area: Not Applicable		Survey Unit: Exterior
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
<p>Surface Scanning</p> <p><i>Change #4 KMM 7/11/00</i></p>	<p>EXTERIOR WALLS/ROOF:</p> <p>Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p>No more^{less} than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>EXTERIOR WALLS/ROOF:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Exterior
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>	
<p>Survey/Sampling Instructions</p>	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively.</p> <p>Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: T331A	
Survey Area: Not Applicable	Survey Unit: Exterior	
<p>Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.</p>		
<p><input checked="" type="checkbox"/> Total Surface Activity <input type="checkbox"/> Media Surface Activity <input checked="" type="checkbox"/> Removable Surface Activity <input type="checkbox"/> Volumetric Surface Activity</p>		
<p>Step 1: Calculate the relative shift Δ/σ_s. $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$</p> <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>		
RICK ROBERTS	[Redacted]	[Signature]
Project RE Printed Name		Project RE Signature
H.B. ESTABROOKS	[Redacted]	[Signature]
RESS RE Printed Name		RESS RE Signature
		Date

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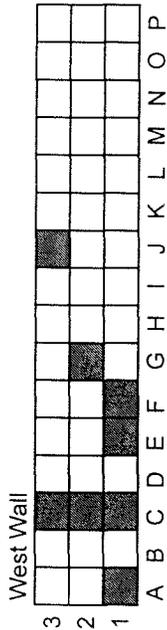
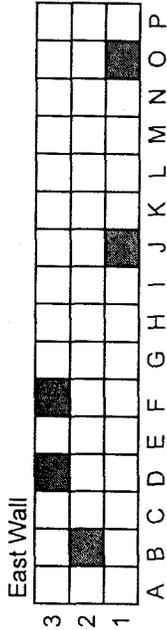
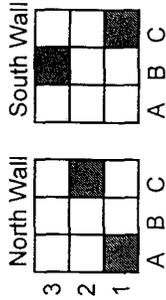
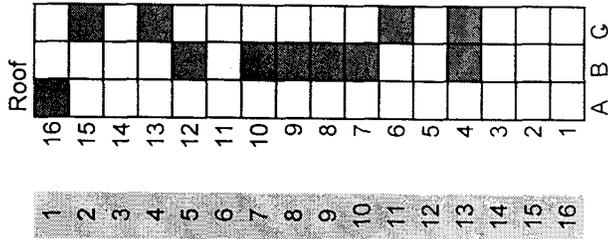
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SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: T331A
Survey Area: Not Applicable	Survey Unit: Exterior
Survey Unit Description: This trailer was brought on to the plant site in 1964 and where it was used is unknown until 1979 when it was moved to its present location at the firebarn. This trailer is approximately 40" long, 10" wide and 8" high with a 2" skirt.	
Floor Area (m²): 45	Total Area (m²): 153
SEE ATTACHED SURVEY MAP	

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T331A Exterior



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19

X-Coordinate	Y-Coordinate
13	6

☐ = one square meter

■ = direct & swipe

1	2	9	11	3	13	21	6	2
2	13	9	12	9	7	22	5	8
3	10	3	13	3	2	23	2	8
4	3	4	14	3	11	24	6	13
5	10	14	15	2	10	25	6	14
6	2	5	16	7	7	26	6	15
7	9	1	17	18	9	27	2	13
8	2	7	18	9	15	28	4	3
9	13	13	19	1	1			
10	4	15	20	8	15			

Total Surface Area = 162 m²

10% Scan Surface Area = 16.2 m²

(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	EDM / 6-2-00	
7.1[1]	DQOs implemented as prescribed	EDM / 6-2-00	
7.1[2]	All required supporting documents present	EDM / 6-2-00	
7.1[3]	Outliers / anomalies addressed	EDM / 6-2-00	
7.2	Data Validation	EDM / 6-2-00	
7.2.1	Survey/Sample Precision	EDM / 6-2-00	see spreadsheets
7.2.2	Survey Accuracy	EDM / 6-2-00	
	Sample Accuracy	EDM / 6-2-00	
7.2.3	Data Representative of survey unit	EDM / 6-2-00	yes
7.2.4	Survey/Sample/Scan Completeness	EDM / 6-2-00	100%
7.2.5	Data Comparable to related units	EDM / 6-2-00	yes, Group B
7.3	DQA complete	EDM / 6-2-00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	EDM / 6-2-00	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	EDM 6/13/00	NOTE
	Package submitted to project management	EDM 6/13/00	
9.1	Records to Records Center (copy to project files)	EDM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

3666

Survey Area: N/A
Survey Unit: Exterior
Building: T331A
Survey Unit Description: Roof and walls of T331A

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: Σ α. my 6/2/00

Removable Activity
(dpm/100 cm²) Alpha

0.6
0.0
3.3
0.6
4.5
1.8
-0.9
3.0
0.3
2.1
1.5
1.8
2.1
-1.5
0.3
-0.9
3.0
1.8
0.6
-1.5
1.8
2.1
3.0
1.8
2.1
-1.5
3.3
-0.9

Survey Area - N/A
Survey Unit - Exterior
Building - T331A
Survey Unit Description - Roof and walls of Trailer T331A
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 1.2 dpm/100 cm²
Std Dev 1.7 dpm/100 cm²

No measurement exceeds the DCGL_w

368

368

364

Removable Activity
(dpm/100 cm²) Beta

0.8
10.8
29.2
14.8
12.8
-24.8
-23.2
46.8
-2.8
16.8
2.8
-2.8
-7.2
30.8
15.2
-5.2
12.8
11.2
4.8
-1.2
-12.8
-1.2
4.8
-14.8
8.8
12.8
5.2
-17.2

Survey Area - N/A
Survey Unit - Exterior
Building - T331A
Survey Unit Description - Roof and walls of Trailer T331A
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean 4.6 dpm/100 cm²
Std Dev 16.1 dpm/100 cm²

No measurement exceeds the DCGL_w

364

**Total Surface Activity
(dpm/100 cm²) Alpha**

18.6
21.4
34
-6.5
34.0
12.6
49.8
25.1
9.3
37.2
19
25.2
34.7
-1.4
19.0
3.3
25.2
35.2
169.1
159.8
179.4
117.3
156.4
250.7
247.3
273.7
130.5
231.2

Survey Area - N/A
Survey Unit - Exterior
Building - T771D
Survey Unit Description - Roof and walls of Trailer T771D
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 82.5 dpm/100 cm²
Std Dev 89.3 dpm/100 cm²

10 measurements exceeds the DCGL_w
10 measurements exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
K-1S	19.0	9.8	9.2	14.4	63.88889
N-2S	25.2	32.3	-7.1	28.75	-24.69565
G-1N	18.6	39.1	-20.5	28.85	-71.05719
J-1N	-6.5	45.5	-52	19.5	-266.6667
M-1N	25.1	48.9	-23.8	37	-64.32432

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/89.3$
 $\Delta/\sigma_s = 0.56$ (default 0.50)
 Sign p = 0.691462
 N = 73.82
 $73.82 * 1.2 = 88.58$
 N = 89

Note: Where TSA results are elevated due to Po-210 concentrations, the Post Survey calculations can indicate that more survey points are needed. These numbers are artificially high because the elevated results are due to Po-210, and not due to DOE-added radionuclides. Consequently, where the presence of NORM (specifically Po-210) is confirmed through alpha spec analysis, Post Survey Statistics Calculations that use survey (TSA) results are not applicable as a means of checking TSA survey frequencies. Adequate survey frequency would be indicated if results attained from analytical samples were used instead.

**Total Surface Activity
(dpm/100 cm²) Beta**

-30
-74
17
-51
249
189
138
0
37
-20
-303
-158
-53
-372
-481
171
-184
-60
37
13
-428
47
-63
80
301
170
177
40

Survey Area - N/A
Survey Unit - Exterior
Building - T331A
Survey Unit Description - Roof and walls of Trailer T331A

Total Surface Activity Data Sheet

DCGL_w 5000 dpm/100 cm²

n 28

Mean -21.8 dpm/100 cm²

Std Dev 194.4 dpm/100 cm²

No measurement exceeds the DCGL_w

No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
A-1N	-158	77	-235	-40.5	580.2469
O-1E	13	3	10	8	125
C-2W	-63	158	-221	47.5	0
A-1W	-428	111	-539	-158.5	340.0631
C-1W	47	-266	313	-109.5	-285.8447

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$$\Delta/\sigma_s = (\text{DCGL-LBGR})/\sigma_s$$

$$\Delta/\sigma_s = (5000-2500)/194.4$$

$$\Delta/\sigma_s = 12.86 \text{ (default to 3)}$$

$$\text{Sign } p = 0.998650$$

$$N = 10.88$$

$$10.88 * 1.2 = 13.05$$

$$N = 14$$

Survey Area: N/A Survey Unit: EXTerior Building: T331A
 Survey Unit Description: Roof & Walls of TRAILER T331A

[Redacted]	[Redacted]	[Redacted]	[Redacted]
[Redacted]	[Redacted]	[Redacted]	[Redacted]
PATRICK CINTUM	[Redacted]	<i>[Signature]</i>	3-4-00
RCT Printed Name		RCT Signature	Date
MARK LAWSON	[Redacted]	<i>[Signature]</i>	3-4-00
RCT Printed Name		RCT Signature	Date
ROBERT KELLEY	[Redacted]	<i>[Signature]</i>	3-4-00
RCT Printed Name		RCT Signature	Date
ARCHIE PARKER	[Redacted]	<i>[Signature]</i>	3-4-00
RCT Printed Name		RCT Signature	Date
A. CHRISTOPHER VIGN	[Redacted]	<i>[Signature]</i>	3-7-00
RCT Printed Name		RCT Signature	Date
MARK LAWSON	[Redacted]	<i>[Signature]</i>	3-9-00
RCT Printed Name		RCT Signature	Date
ARCHIE PARKER	[Redacted]	<i>[Signature]</i>	3-9-00
RCT Printed Name		RCT Signature	Date

[Redacted]	[Redacted]	<i>[Signature]</i>	3-9-00
PATRICK CINTUM	[Redacted]	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	<u>N/A</u>	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<u>RON WORSTEN</u>	[Redacted]	<i>[Signature]</i>	3-10-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

372

Survey Area: N/A	Survey Unit: EX-1000	Building: T331A
Survey Unit Description: Rev. Work T331A		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

#10	<i>Patrick C...</i>		<i>P. C...</i>	3/4/00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<i>Rev. Work</i>		<i>[Signature]</i>	6/6/00
RCT Foreman Printed Name		RCT Foreman Signature	Date

373

Survey Area: NIA	Survey Unit: EXTERIOR	Building: T331A
Survey Unit Description Rail - Curbs & Trancee T331A		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	ESSELVE	ESSELVE	ESSELVE	ESSELVE	ESSELVE	ESSELVE
Model	SAC 4	SAC 4	SAC 4	BC 4	BC 4	BC 4
Inst. ID #	1	2	3	4	5	6
Serial #	1170	1171	961	80923	80369	82941
Cal. Due Date	6-30-00	7-11-00	6-21-00	3-27-00	7-17-00	6-27-00
Analysis Date	3-7-00	3-7-00	3-7-00	3-7-00	3-7-00	3-7-00
Instrument Bkg ^{cpm} 10-min count time	0.3	0.5	0.4	40.3	38.3	40.2
Instrument Eff (%)	33	33	35	25	25	25
Instrument MDA 2-min count time _{dpm}	8.3	9.6	9.6	70.1	65.5	70.1

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model	Electra		Electra		Electra		ELECTRA		ELECTRA		ELECTRA	
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2376	1921	2318	1956	1375	1368	2335	1931	1315	1368	2318	1956
Cal. Due Date	8-23-00		5-3-00		7-19-00		6-19-00		7-19-00		5-3-00	
Survey Date	3-4-00		3-4-00		3-4-00		3-4-00		3-4-00		3-4-00	
Alpha Bkg 90-sec ^{cpm} count time	3.3		380		2		406		2.7		355	
Beta Bkg 90-sec ^{cpm} count time	2		485		4		485		2		307	
Alpha Eff (%)	20.46		29.70		22.55		30.56		21.03		28.55	
Beta Eff (%)	20.46		29.70		22.55		30.56		21.03		28.55	
Alpha MDA 90-sec _{dpm} count time	42.6		255.4		32.1		258.1		38.3		259	
Beta MDA 90-sec _{dpm} count time	42.6		255.4		32.1		258.1		38.3		259	

374

11

Survey Area: <i>N/A</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T331A</i>
Survey Unit Description: <i>2000 + 4000s of Terrace T331A</i>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6
Serial #						
Cal. Due Date						
Analysis Date						
Instrument Bkg <i>cpm</i> 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time <i>dpm</i>						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	13 <i>7th 3410</i>		8		9		10	11	12
Serial # / Probe #	2376	1921							
Cal. Due Date	8-23-00								
Survey Date	3-9-00								
Alpha Bkg 90-sec <i>cpm</i> count time	Beta Bkg 90-sec <i>cpm</i> count time	2	380						
Alpha Eff (%)	Beta Eff (%)	20.46	29.70						
Alpha MDA 90-sec <i>dpm</i> count time	Beta MDA 90-sec <i>dpm</i> count time	35.1	255						

375

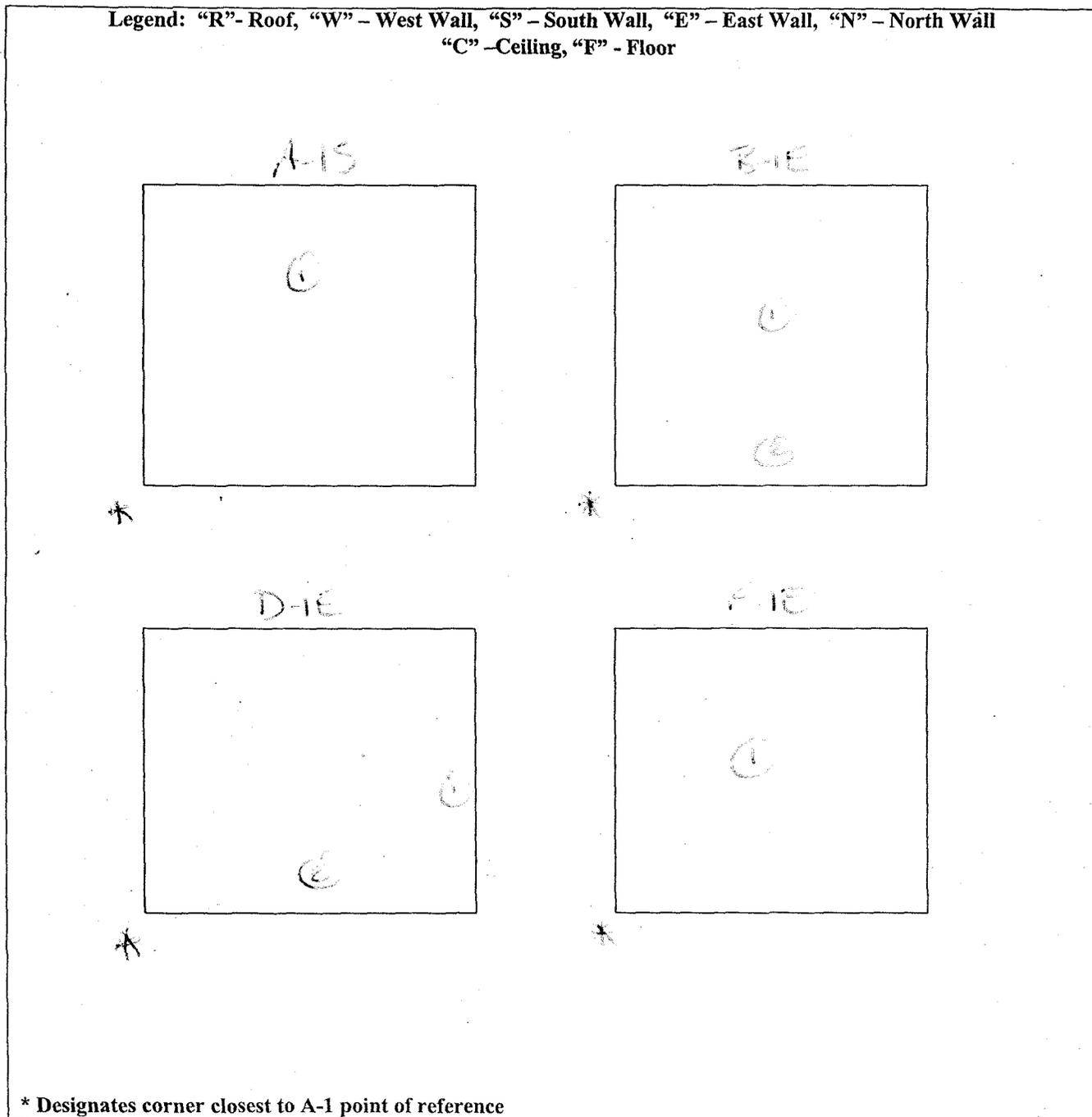
~

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>TSSLT</u>
Survey Unit Description: <u>Roof & Windows of TRANS. TSSLT</u>		
RCT Initials/Date: <u>MA 3/9/00</u>	RCT Initials/Date: <u>MA</u>	RCT Initials/Date: <u>MA</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

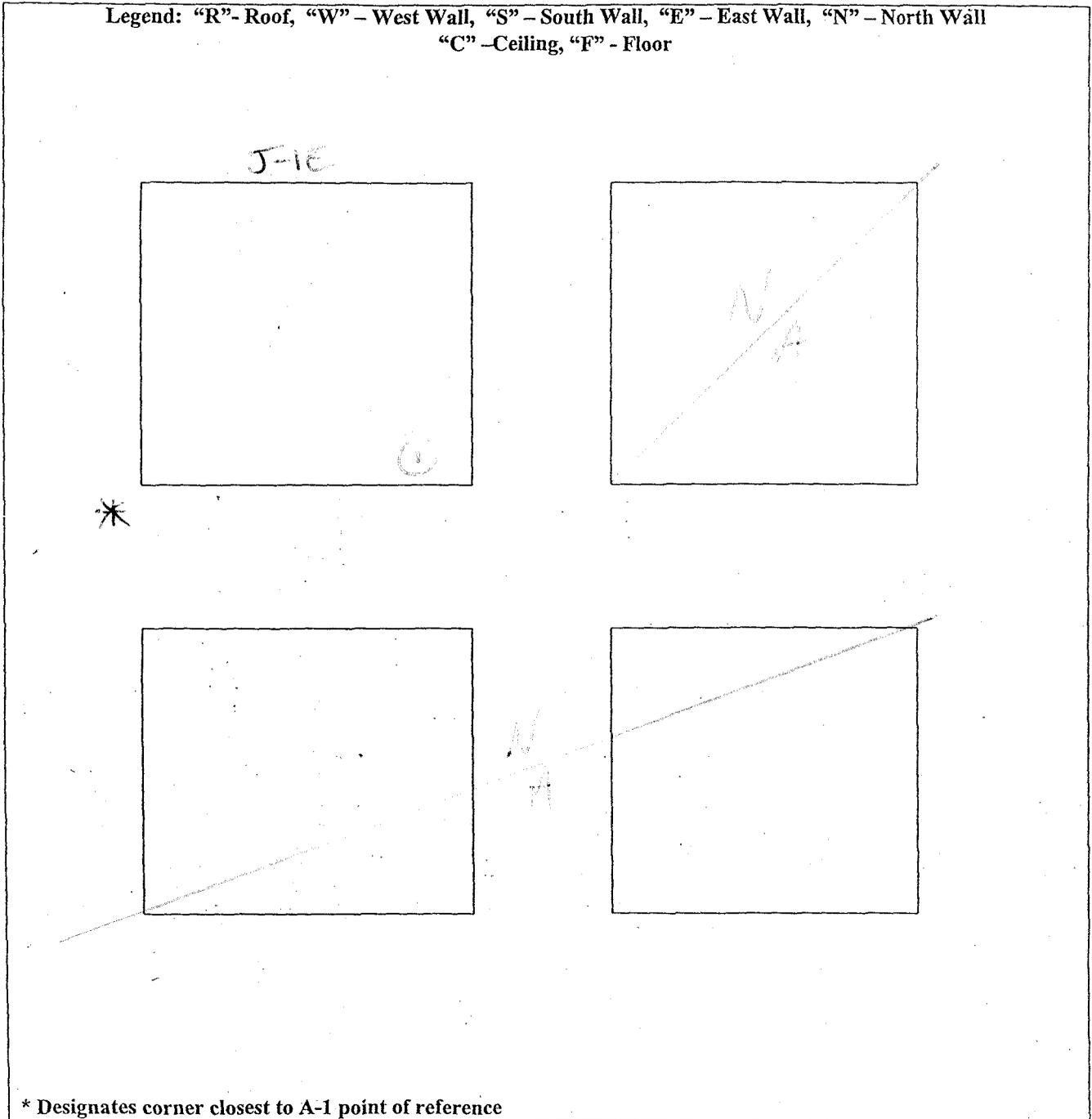
377

2

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>N/A</i>	Survey Unit: <i>OUTSIDE</i>	Building: <i>T331A</i>
Survey Unit Description: <i>Roof + walls of TRAIL T331A</i>		
RCT Initials/Date: <i>PJL 3/19/00</i>	RCT Initials/Date: <i>N/A</i>	RCT Initials/Date: <i>N/A</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

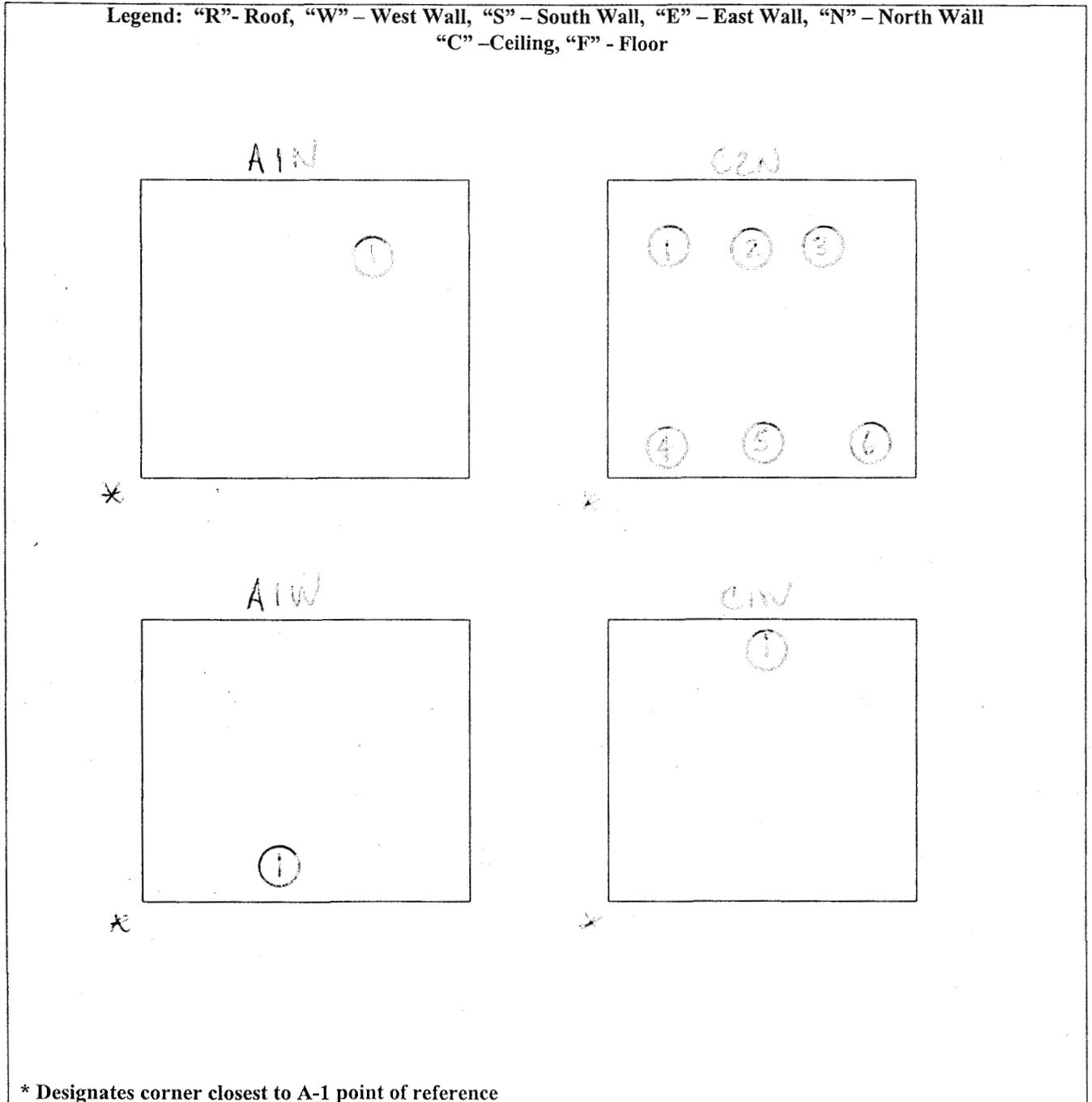
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: N/A	Survey Unit: EXTERIOR	Building: T331A
Survey Unit Description: Exterior		
RCT Initials/Date: [Signature] 3/9/00	RCT Initials/Date: N/A	RCT Initials/Date: N/A

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

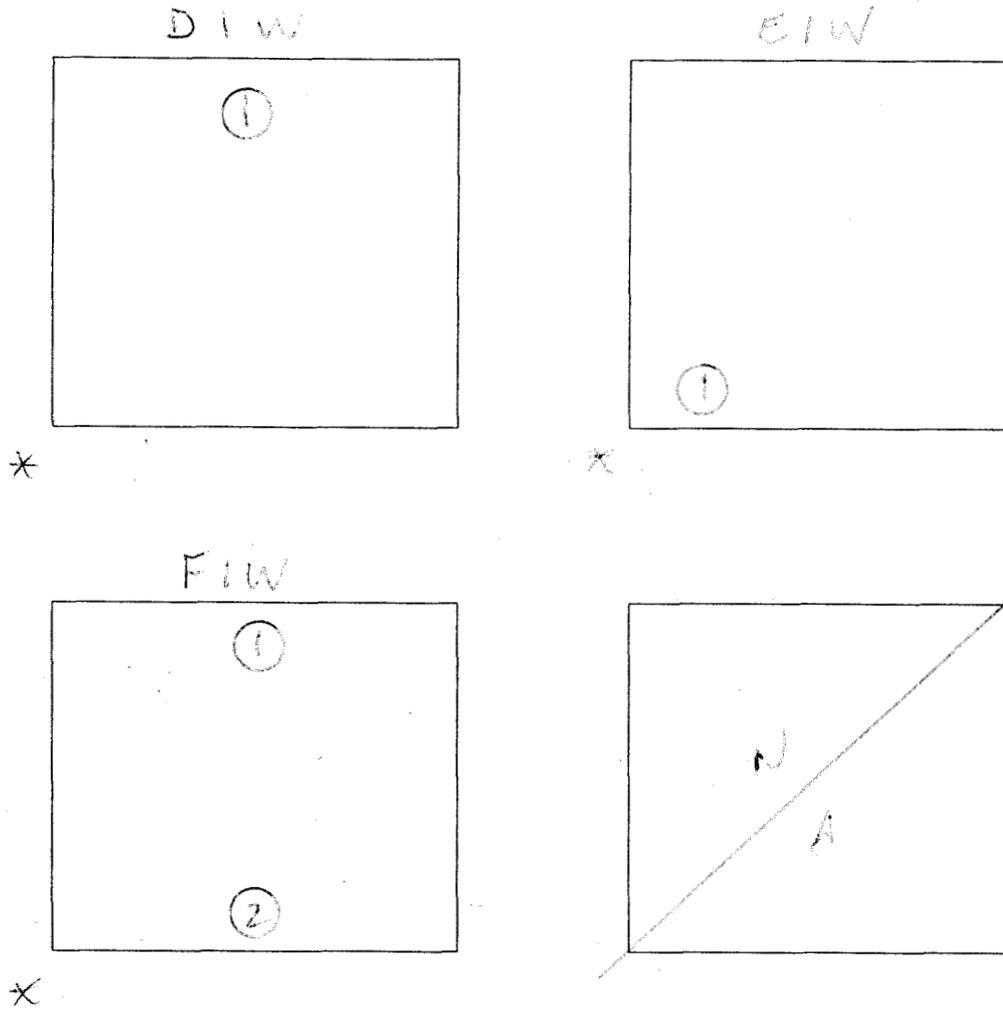
379

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: N/A	Survey Unit: EXTERIOR	Building: T331A
Survey Unit Description: EXTERIOR		
RCT Initials/Date: [Signature] 3/9/00	RCT Initials/Date: N/A	RCT Initials/Date: N/A

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" -Ceiling, "F" - Floor**



*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

380

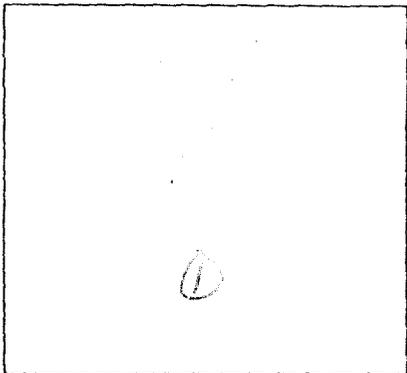
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <i>NA</i>	Survey Unit: <i>EXTERIOR</i>	Building: <i>T 331A</i>
Survey Unit Description: <i>9 POINT INVESTIGATION AND Q.C. SCAN</i>		
RCT Initials/Date: <i>PC 3-9-00</i>	RCT Initials/Date: <i>N/A</i>	RCT Initials/Date: <i>N/A</i>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

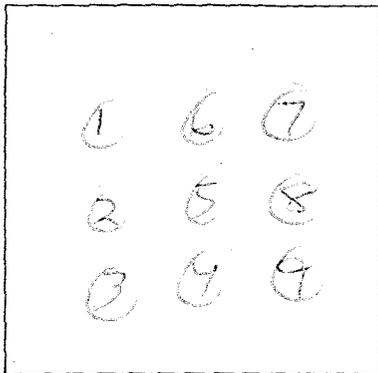
**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**

Q.C. SCAN

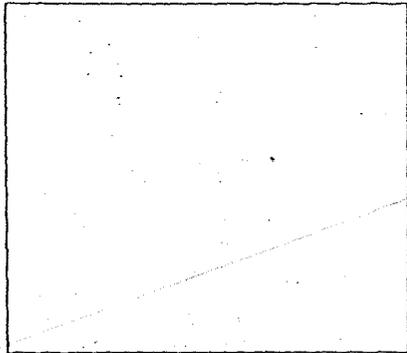


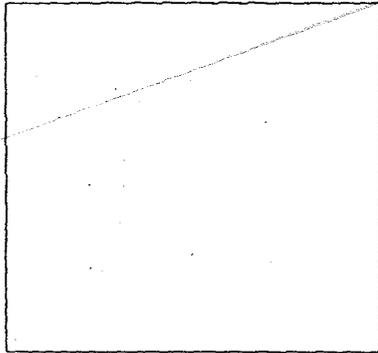
** S-1 W*

9 POINT INVESTIGATION



** A-16 R*





*** Designates corner closest to A-1 point of reference**

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: <u>N/A</u>		Survey Unit: <u>EXTERIOR</u>			Building: <u>T331A</u>				
Survey Unit Description: <u>ROOF & WINDS OF TRUSS T331A</u>									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
A-15		11	N			11	Y	8	
B-15		11	N			11	N	N/A	
C-15		11	N			11	N	N/A	
B-1E		11	N			11	Y	12	
B-1E2		11	N			11	Y	24	
D-1E1		11	N			11	Y	10	
D-1E2		11	N			11	Y	4	
F-1E1		11	N			11	Y	14	
F-1E1		11	N			11	Y	20	
O-1E		11	N			11	N	N/A	
A-1W1		12	N	N		12	Y	6	
C-1W		12	N	N		12	N	N/A	14
C-2W1		12	N			12	Y	12	
C-2W2		12	N			12	Y	12	
C-2W3		12	N			12	Y	6	
C-2W4		12	N			12	Y	10	
C-2W5		12	N			12	Y	10	
C-2W6		12	N			12	Y	10	
A-1W1		12	N			12	Y	10	
C-1W1		12	N			12	Y	6	
D-1W1		12	N			12	Y	4	
E-1W1		12	N			12	Y	4	
F-1W1		12	N			12	Y	4	
F-1W2		12	N			12	Y	4	
G-1W		12	N			12	N	N/A	
		12	N						

382

Survey Area: N/A Survey Unit: exterior Building: T331A
 Survey Unit Description: Roof + Walls of TRAILER T331A.

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm2)	
		α	β	α	β	α	β	α	β	α	β	α	β
A-4R		7	7	90	90	4	501	353	358	353	-4	172.5	-30
B-4R		7	7	90	90	27	552	32	510	293	-22	143.2	-74
B-7R		7	7	90	90	27	500	353	511	158	5	249.6	17
B-8R		7	7	90	90	33	492	213	2477	24	-15	117.3	-51
B-9R		7	7	90	90	1	458	207	532	187	74	96.4	249
B-10R		7	7	90	90	1	460	22	506	20	56	97.8	189
B-12R		7	7	90	90	27	446	253	487	226	41	110.5	138
C-4R		7	7	90	90	13	512	357	512	294	0	143.7	0
C-6R		7	7	90	90	33	510	243	521	26	11	127.1	37
C-13R		7	7	90	90	4	571	34	505	30	-6	146.6	-20
C-15R		7	7	90	90	33	573	293	483	26	-90	127.1	-303
A-1W		8	8	90	90	2	414	113	366	93	-48	41.6	-158
C-2W		8	8	90	90	33	394	73	378	4	-16	17.9	-53
B-3S		8	8	90	90	2	458	10	348	8	-113	35.5	-372
C-1S		8	8	90	90	33	444	4	348	0.7	146	3.1	-481
B-2E		9	9	90	90	133	286	127	337	-0.6	51	-2.9	171
D-3E		9	9	90	90	8	377	127	342	4.7	-55	22.3	-184
F-3E		9	9	90	90	8	373	147	355	6.2	-18	31.9	-60
J-1E		9	9	90	90	107	338	6	349	-4.7	11	-22.3	37
O-1E		9	9	90	90	183	316	12	320	-1.3	4	-6.2	13
A-1W		10	10	90	90	47	458	47	330	0	-128	0	-428
C-1W		10	10	90	90	8	313	10	327	2	14	9.3	47
C-2W		10	10	90	90	73	382	47	363	-2.6	-19	-12.1	-63
C-3W		10	10	90	90	53	375	8	349	2.7	24	12.6	80
E-1W		10	10	90	90	27	303	12	343	9.3	90	43.3	-301
F-1W		10	10	90	90	2	305	10	336	4	51	18.6	170
G-2W		10	10	90	90	4	366	10	419	6	53	27.9	177
J-3W		10	10	90	90	47	347	10	359	5.3	12	24.7	40
A-1WQC		13	13	90	90	27	342	93	305	6.6	23	32.3	77
O-1EQC		13	13	90	90	13	360	8	361	6.7	1	36.7	3
C-2WQC		13	13	90	90	33	344	12	311	7.9	47	39.0	158
A-1WQC		13	13	90	90	2	314	6	347	6	33	24.3	111
C-1WQC		13	13	90	90	2	410	127	331	107	-74	452.3	-266

Note: QC measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" - local area background.

385

3-376

N

Survey Area: N/A Survey Unit: CHEKIC Building: T351A
 Survey Unit Description: 2nd Floor of T351A

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
A-1GR		1	4	0.5	46.5	0.2	0.2	0.6	6.5
B-1R		2	5	0.5	41	0	2.7	0	10.5
B-1R		3	6	1.5	47.5	0.1	7.3	3.3	27.2
B-5R		1	4	0.5	41	0.2	2.7	0.6	14.5
B-9R		2	5	2	41.5	1.5	3.2	4.5	12.8
B-10R		3	6	1	34	0.6	0.12	0.8	24.8
B-12R		1	4	0	34.5	-0.3	-0.8	0.2	24.8
C-4R		2	5	1.5	50	1	1.7	3	46.8
C-6R		3	6	0.5	39.5	0.1	0.2	0.3	27.2
C-13R		1	4	1	44.5	0.3	4.2	2.1	16.8
C-15R		2	5	1	37	0.3	0.7	1.5	12.8
A-1W		3	6	1	36.5	0.6	-0.7	0.8	-2.8
C-2W		1	4	1	36.5	0.3	-1.8	0.1	-7.2
B-35 th		2	5	0	46	-0.5	1.7	1.5	30.8
C-1X5		3	6	0.5	44	0.1	2.8	0.3	15.2
B-2E		1	4	0	34	-0.6	-1.3	-0.9	-5.2
D-3E		2	5	1.5	41.5	1	3.5	3	12.8
F-3E		3	6	1	43	0.6	2.8	0.8	11.2
S-1E		1	4	0.5	41.5	0.6	1.2	0.6	4.8
C-1E		2	5	0	35	-0.5	-0.3	-0.5	-1.2
A-1W		3	6	1	37	0.6	-3.2	0.5	-12.8
C-1W		1	4	1	40	2.1	-0.3	2.1	17.2
C-2W		2	5	1.5	39.5	1	0.2	3	4.8
C-3W		3	6	1	36.5	0.6	-3.7	1.3	-14.8
E-1W		1	4	1	42.5	0.7	2.2	2.1	8.8
E-1W		2	5	0	41.5	-0.5	3.2	-1.5	12.8
C-2W		3	6	1.5	41.5	1.1	0.2	3.3	5.2
S-3W		1	4	0	36	-0.3	-1.3	-0.9	-17.2

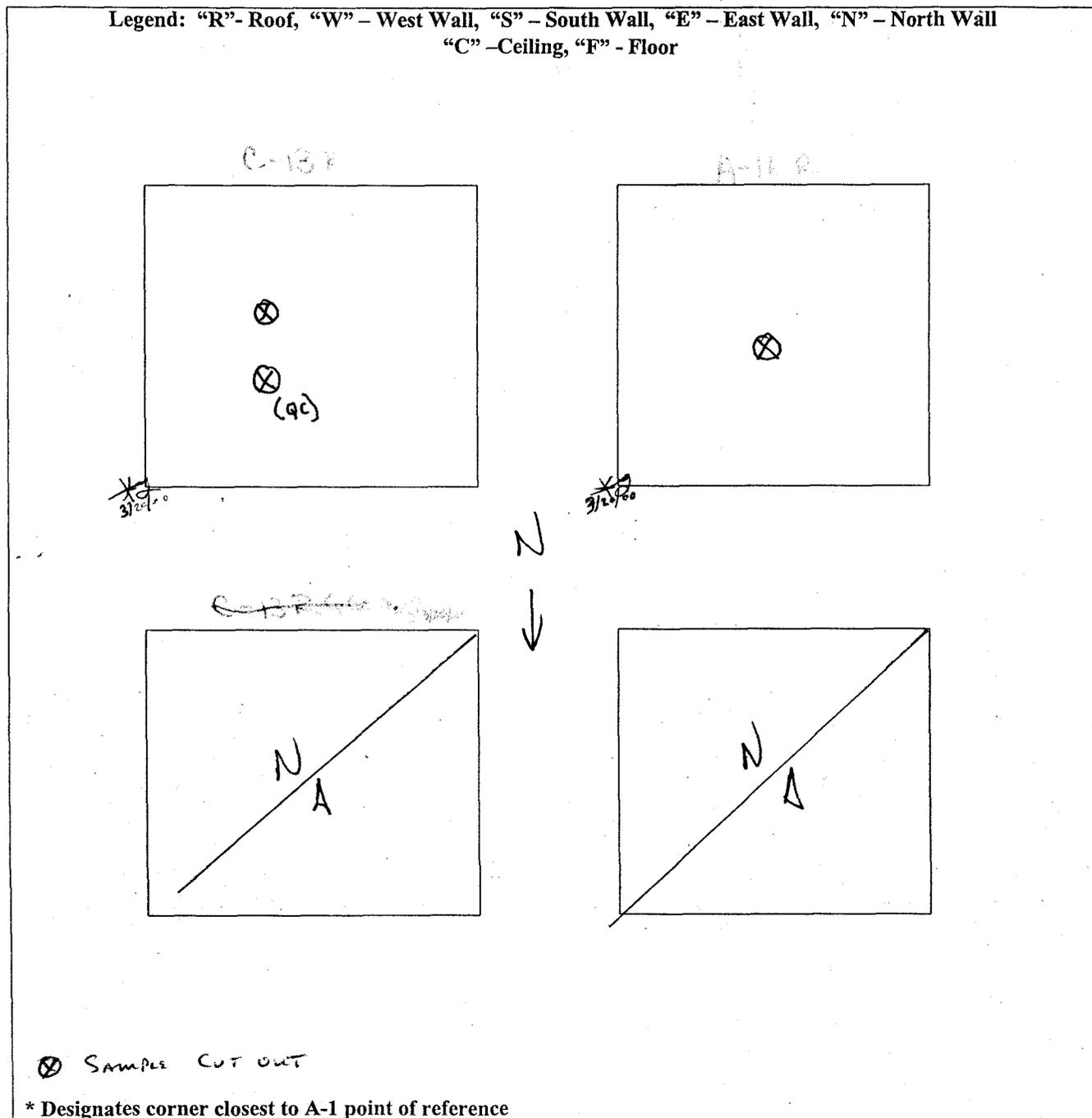
386

N

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EXT 1000</u>	Building: <u>T331A</u>
Survey Unit Description: <u>ROOF SAMPLE LOCATIONS</u>		
RCT Initials/Date: <u>TRD 3/29/00</u>	RCT Initials/Date: <u>NA</u>	RCT Initials/Date: <u>NA</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

Survey Area: NA	Survey Unit: Exterior	Building: T331A
Survey Unit Description Roof Sample Location		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE	EBERLINE	EBERLINE		
Model	SAC4	BC4	SAC4	BC4		
Inst. ID #	1	2	3	4	5	6
Serial #	823	966	1171	868		
Cal. Due Date	9/6/00	9/15/00	7/11/00	7/12/00		
Analysis Date	3/29/00	3/29/00	3/29/00	3/29/00		
Instrument Bkg. ^{cpm} 10-min count time	0.5	38.1	0.6	38.8		
Instrument Eff (%)	33	25	33	25		
Instrument MDA ^{dpm} 2-min count time	9.6	68.3	10.1	68.9	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.		N.E. Tech.			
Model	Electra		Electra		Electra		Electra			
Inst. ID #	7		8		9		10		11	12
Serial # / Probe #	2374	1919	2376	1921						
Cal. Due Date	9/8/00		8/23/00							
Survey Date	3/28/00		3/28/00							
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90 sec count time ^{cpm}	4.7	406	3.3	407					
Alpha Eff (%)	Beta Eff (%)	20.85	29.89	20.46	29.7					
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	48.2	262	42.6	264	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: B331A	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS	[REDACTED]	[Signature]	11-2-00
Radiological Engineer Printed Name		Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[REDACTED]	[Signature]	1/24/00
RESS Manager Printed Name		RESS Manager Signature	Date
Survey Package Closure:			
RICK ROBERTS	[REDACTED]	[Signature]	
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date
NOT APPLICABLE		N/A	N/A
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS	[REDACTED]	[Signature]	8-14-00
RESS Manager Printed Name		RESS Manager Signature	Date

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: B331A	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Change #	Description	Initiator/ Date	PRE
1	a) Incorporate requirements of Letter KAM-001-00, dated 2/18/00 (see p. 2 of 2)	KAM 2/18/00	✓
	b) Incorporate requirements of Letter KAM-002-00, dated 2/19/00 (see p. 2 of 2)		
	c) Incorporate revision to the Survey map. Space marked delineated area shall delineate 2' offset setback		
	d) 50% of the area shall shall be on the interior and 50% on the exterior 50% of the exterior area area shall be on the north		
2	1 sample & 1 AC sample required	KAM 6/1/00	✓
3	Roof Survey / sampling performed per Letter KAM-003-00 (p 31 of 212)	KAM 6/7/00	✓
4	Corrected SCAM requirement	KAM 7/11/00	✓

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: B331A		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior		Area (m ²): 114	
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type: Change # 2 DM 6/1/00		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: B331A
Survey Area: Not Applicable		Survey Unit: Interior/Exterior
<p>Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	<p>INTERIOR & EXTERIOR SURFACES: 28 surveys will be taken per the attached survey map.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>
	<p><u>QUALITY ASSURANCE SURVEYS</u> INTERIOR & EXTERIOR SURFACES: 5 surveys will be taken per direction from radiological engineering.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: B331A
Survey Area: Not Applicable		Survey Unit: Interior/Exterior
<p>Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.</p>		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning	<p>INTERIOR & EXTERIOR SURFACES:</p> <p>Biased surface scans will be performed on the interior floors in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring.</p> <p>Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned.</p> <p>Change #4 DM 7-11-00</p> <p>No more^{less} than 10% of the total area will be scanned.</p> <p><u>QUALITY ASSURANCE SCAN SURVEYS</u></p> <p>INTERIOR & EXTERIOR SURFACES:</p> <p>5 percent of total number of scans or of total scan area will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1</p> <p>SEE NOTE 2</p> <p>SEE NOTE 3</p> <p>SEE NOTE 4</p> <p>SEE NOTE 5</p> <p>SEE NOTE 6</p>
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: B331A
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.	
Survey/Sampling Instructions	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicorn/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: B331A
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: B331A		
Survey Area: Not Applicable	Survey Unit: Interior/Exterior		
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.			
<input checked="" type="checkbox"/> Total Surface Activity	<input type="checkbox"/> Media Surface Activity		
<input checked="" type="checkbox"/> Removable Surface Activity	<input type="checkbox"/> Volumetric Surface Activity		
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>			
RICK ROBERTS	[Redacted]	[Signature]	11/21/00
Project RE Printed Name		Project RE Signature	Date
H.B. ESTABROOKS	[Redacted]	[Signature]	11/21/00
RESS RE Printed Name		RESS RE Signature	Date

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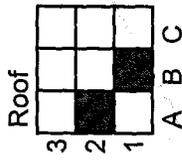
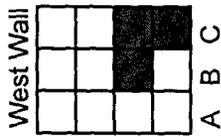
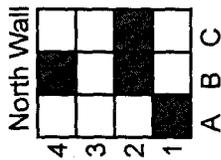
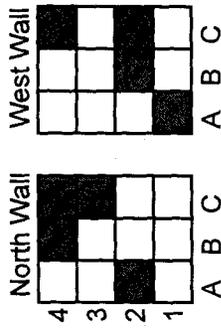
403

SURVEY PACKAGE SURVEY MAP

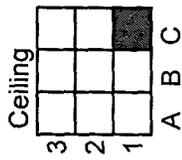
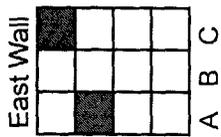
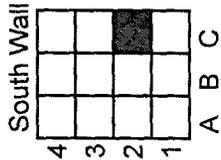
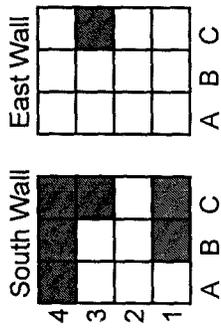
Package ID: 2000-01	Building: B331A
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 331A was constructed in approximately 1964. This building is located at Sage Avenue and Fourth Street, directly north of Building 335. The size of Building 331A is approximately 12' long by 10' wide and approximately 12 feet high.	
Floor Area (m²): 16	Total Area (m²): 114
SEE ATTACHED SURVEY MAP	

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331A - Interior



331A - Exterior



X-Coordinate	Y-Coordinate
14	5

□ = one square meter
 ■ = direct & swipe

Total Surface Area = 114 m²

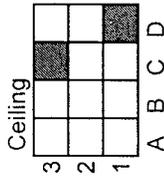
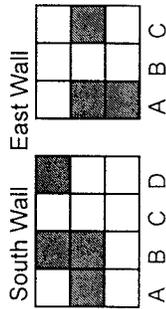
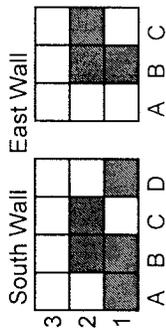
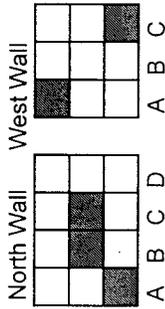
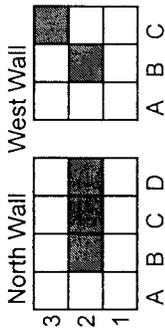
10% Surface Area = 11.4 m²

1	2	8	11	3	2	21	X	Y
2	9	3	12	3	6	22	2	5
3	3	8	13	14	3	23	2	1
4	15	7	14	8	1	24	8	3
5	9	7	15	6	6	25	4	4
6	11	3	16	13	2	26	1	3
7	6	3	17	10	6	27	12	3
8	5	3	18	1	5	28	3	5
9	7	4	19	12	4			
10	6	1	20	3	1			

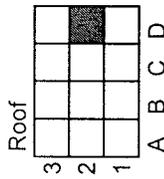
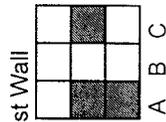
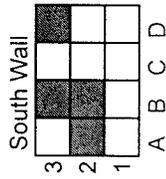
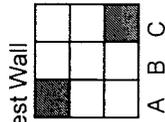
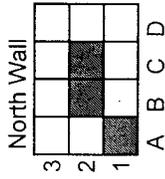
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331A - Interior



331A - Exterior



1 2 3 4 5 6 7 8 9

1 2 3 4 5 6 7 8 9 10 11 12 13 14

X-Coordinate	Y-Coordinate
6	8

□ = one square meter
 ■ = direct & swipe

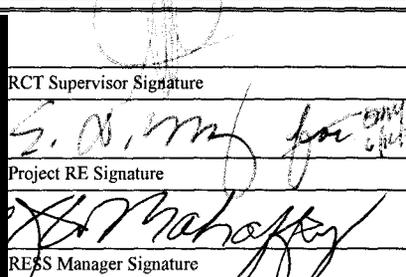
Total Surface Area = 108 m²
 10% Surface Area = 10.8 m²

1	8	5	11	11	4	21	7	5
2	14	3	12	2	5	22	11	8
3	12	1	13	14	5	23	12	5
4	2	6	14	4	9	24	6	5
5	4	2	15	9	4	25	3	7
6	12	6	16	2	2	26	4	6
7	3	2	17	6	6	27	1	6
8	3	5	18	9	2	28	6	2
9	9	5	19	10	2			
10	8	3	20	7	1			

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1/10/10

SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: B331A	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion	RCT Supervisor	PRE	
Scan Surveys	<i>[Signature]</i>	RDM	
Total Activity Surveys	<i>[Signature]</i>	RDM	
Exposure Rate Surveys	N/A	N/A	
Removable Surveys	<i>[Signature]</i>	RDM	
Media Samples	<i>[Signature]</i>	RDM	
Volumetric Samples	N/A	N/A	
All Surveys and Samples Accounted For	RCT Supervisor	PRE	
Scan Surveys	<i>[Signature]</i>	RDM	
Total Activity Surveys	<i>[Signature]</i>	RDM	
Exposure Rate Surveys	N/A	N/A	
Removable Surveys	<i>[Signature]</i>	RDM	
Media Samples	<i>[Signature]</i>	RDM	
Volumetric Samples	N/A	N/A	
Comments:			
<i>Rick Roberts</i> RCT Supervisor Printed Name		 RCT Supervisor Signature	6-12-00 Date
RICK ROBERTS <i>ERM 6/12/00</i> <i>ERIC D. McNamey</i> Project RE Printed Name		<i>Eric D. McNamey</i> Project RE Signature	6-12-00 Date
H. B. ESTABROOKS <i>JEM 8/14/00</i> <i>J. W. Mahaffey</i> RESS Manager Printed Name		 RESS Manager Signature	8-14-00 Date

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APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	EDM 6/7/00	
7.1[1]	DQOs implemented as prescribed	EDM 6/7/00	
7.1[2]	All required supporting documents present	EDM 6/7/00	
7.1[3]	Outliers / anomalies addressed	EDM 6/7/00	
7.2	Data Validation	EDM 6/7/00	
7.2.1	Survey/Sample Precision	EDM 6/7/00	see spreadsheets
7.2.2	Survey Accuracy	EDM 6/7/00	
	Sample Accuracy	EDM 6/7/00	
7.2.3	Data Representative of survey unit	EDM 6/7/00	yes
7.2.4	Survey/Sample/Scan Completeness	EDM 6/7/00	100%
7.2.5	Data Comparable to related units	EDM 6/7/00	yes, Grp B
7.3	DQA complete	EDM 6/7/00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	EDM 6/7/00	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	EDM 6/13/00	NONE
	Package submitted to project management	EDM 8/22/00	
9.1	Records to Records Center (copy to project files)	EDM 8/22/00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Interior/Exterior
Building: B331A
Survey Unit Description: Roof, walls, floors and ceiling of B331A

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by: _____

S. D. [Signature] 6/7/00

Removable Activity
(dpm/100 cm²) Alpha

1.5
4.5
-1.5
-1.5
1.5
1.5
3.0
6.0
4.5
0.0
3.0
4.5
0.0
-1.5
-1.5
1.5
4.5
0.0
-1.5
0.0
1.5
-1.5
-1.5
1.5
0.0
0.0
0.0
0.0

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B331A
Survey Unit Description - Roof, walls, ceiling and floors of B331A
Removable Contamination Data Sheet
DCGL_w 20 dpm/100 cm²
n 28
Mean 1.0 dpm/100 cm²
Std Dev 2.2 dpm/100 cm²
No measurement exceeds the DCGL_w

Removable Activity
(dpm/100 cm²) Beta

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B331A
Survey Unit Description - Roof, walls, ceiling and floors of B331A
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean -1.1 dpm/100 cm²
Std Dev 11.0 dpm/100 cm²

No measurement exceeds the DCGL_w

- 24
- 0
- 10
- 10
- 12
- 12
- 28
- 2
- 14
- 6
- 12
- 6
- 12
- 12
- 2
- 4
- 6
- 0
- 8
- 0
- 0
- 2
- 18
- 4
- 2
- 4
- 16
- 6

**Total Surface Activity
(dpm/100 cm²) Alpha**

26.8
-2.7
24.9
26.8
29.5
-2.9
-9.5
22.3
-16.2
9.5
42.1
18.8
195.5
11.6
12.1
8.9
-2.7
15.2
6.3
24.2
17.9
5.8
8.9
-6.3
8.9
15.2
12.1
2.7

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B331A
Survey Unit Description - Roof, walls, ceiling and floors of B331A
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 18.1 dpm/100 cm²
Std Dev 37.1 dpm/100 cm²

1 measurement exceeds the DCGL_w
1 measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
B-2N	-2.7	9.8	-12.5	3.55	-352.1127
C-2N	24.9	23.0	1.9	23.95	7.933194
B-2S	-9.5	22.5	-32	6.5	-492.3077
C-2S	5.8	6.8	-1	6.3	-15.87302
B-2W	-2.7	23.0	-25.7	10.15	-253.202

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (100-50)/37.1$
 $\Delta/\sigma_s = 1.35$ (default 1.3)
 Sign p = 0.903199
 N = 16.65
 $16.65 * 1.2 = 19.97$
 N = 20

**Total Surface Activity
(dpm/100 cm²) Beta**

-366
-698
-639
-481
-362
-54
134
34
70
97
379
13
603
-204.2
-395.3
-32.9
-352.4
-210.8
52.7
6.6
-362.3
-270.1
-177.9
23.1
-421.6
-658.8
-108.7
-29.6

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B331A
Survey Unit Description - Roof, walls, ceiling and floors of B331A
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean -157.6 dpm/100 cm²
Std Dev 302.6 dpm/100 cm²

No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
B-2N	-698	198.7	-896.7	-249.65	359.1829
C-2N	-639	-225.6	-413.4	-432.3	95.62804
B-2S	134	47.1	86.9	90.55	95.96908
C-2S	-270.1	64	-334.1	-103.05	324.2115
B-2W	-352.4	178.5	-530.9	-86.95	610.5808

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/302.6$
 $\Delta/\sigma_s = 8.26$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

Survey Area: <u>JA</u>	Survey Unit: <u>INT/EXT</u>	Building: <u>8331A</u>
Survey Unit Description <u>Roof, Walls, Ceilings & Floors of 8331A</u>		

SURVEY SIGNATURE SHEET

Removable / Total Surface Activity Performed By

<u>MARK LAWSON</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-4-00</u> Date
<u>ROBERT KELLEY</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-4-00</u> Date
<u>PATRICK CHITTON</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-4-00</u> Date
<u>A. PARKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-8-00</u> Date
<u>Robert Kelley</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-9-00</u> Date
<u>M. LAWSON</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-10-00</u> Date
<u>Robert Kelley</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-10-00</u> Date

Quality Control Measurements Performed By

<u>PATRICK CHITTON</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-9-00</u> Date
<u>A. PARKER</u> RCT Printed Name	[REDACTED]	<u>[Signature]</u> RCT Signature	<u>3-10-00</u> Date
	Employee # <u>N</u>	<u>[Signature]</u> RCT Signature	
	Employee # <u>A</u>		

Survey Reviewed By

<u>Row Warbler</u> RCT Foreman Printed Name	[REDACTED]	<u>[Signature]</u> RCT Foreman Signature	<u>3-13-00</u> Date
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414

Survey Area: <i>N/A</i>	Survey Unit: <i>INT/EXT</i>	Building: <i>B3314</i>
Survey Unit Description <i>Roof, Walls, Columns & Floors of B3314</i>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>	<i>Eberline</i>
Model	<i>SACH</i>	<i>BC4</i>	<i>SACH</i>	<i>SACH</i>	<i>BC4</i>	<i>BC4</i>
Inst. ID #	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>
Serial #	<i>961</i>	<i>961</i>	<i>1170</i>	<i>1171</i>	<i>928</i>	<i>868</i>
Cal. Due Date	<i>6-21-00</i>	<i>6-27-00</i>	<i>6-30-00</i>	<i>7-11-00</i>	<i>3-27-00</i>	<i>7-12-00</i>
Analysis Date	<i>3-8-00</i>	<i>3-8-00</i>	<i>3-9-00</i>	<i>3-9-00</i>	<i>3-9-00</i>	<i>3-9-00</i>
Instrument Bkg <i>cpm</i> 10-min count time	<i>0.5</i>	<i>40.0</i>	<i>0.5</i>	<i>0.5</i>	<i>39.0</i>	<i>41.0</i>
Instrument Eff (%)	<i>33</i>	<i>25</i>	<i>33</i>	<i>33</i>	<i>25</i>	<i>25</i>
Instrument MDA 2-min count time <i>dpm</i>	<i>9.6</i>	<i>69.9</i>	<i>9.6</i>	<i>9.6</i>	<i>69.1</i>	<i>70.7</i>

Total Surface Activity Instrument Data

Manufacturer	<i>N.E. Tech.</i>		<i>N.E. Tech.</i>		<i>N.E. Tech.</i>		<i>NE. TECH</i>		<i>NE TECH</i>		<i>NE TECH</i>	
Model	<i>Electra</i>		<i>Electra</i>		<i>Electra</i>		<i>ELECTRA</i>		<i>ELECTRA</i>		<i>ELECTRA</i>	
Inst. ID #	<i>7</i>		<i>8</i>		<i>9</i>		<i>10</i>		<i>11</i>		<i>12</i>	
Serial # / Probe #	<i>2378</i>	<i>1956</i>	<i>1395</i>	<i>1368</i>	<i>2576</i>	<i>1921</i>	<i>2376</i>	<i>1921</i>	<i>2378</i>	<i>1956</i>	<i>1375</i>	<i>1368</i>
Cal. Due Date	<i>5-3-00</i>		<i>7-19-00</i>		<i>8-23-00</i>		<i>8-23-00</i>		<i>5-3-00</i>		<i>7-19-00</i>	
Survey Date	<i>3-4-00</i>		<i>3-4-00</i>		<i>3-4-00</i>		<i>3-9-00</i>		<i>3-9-00</i>		<i>3-10-00</i>	
Alpha Bkg 90-sec <i>cpm</i> count time	<i>1.3</i>	<i>363</i>	<i>2.0</i>	<i>406</i>	<i>2.0</i>	<i>377</i>	<i>2.7</i>	<i>360</i>	<i>4.0</i>	<i>356</i>	<i>2.0</i>	<i>367</i>
Beta Bkg 90-sec <i>cpm</i> count time	<i>22.55</i>	<i>30.56</i>	<i>21.05</i>	<i>29.55</i>	<i>20.46</i>	<i>29.70</i>	<i>20.46</i>	<i>29.70</i>	<i>22.35</i>	<i>30.36</i>	<i>20.89</i>	<i>28.68</i>
Alpha Eff (%)	<i>22.55</i>	<i>30.56</i>	<i>21.05</i>	<i>29.55</i>	<i>20.46</i>	<i>29.70</i>	<i>20.46</i>	<i>29.70</i>	<i>22.35</i>	<i>30.36</i>	<i>20.89</i>	<i>28.68</i>
Beta Eff (%)	<i>22.55</i>	<i>30.56</i>	<i>21.05</i>	<i>29.55</i>	<i>20.46</i>	<i>29.70</i>	<i>20.46</i>	<i>29.70</i>	<i>22.35</i>	<i>30.36</i>	<i>20.89</i>	<i>28.68</i>
Alpha MDA 90-sec <i>dpm</i> count time	<i>27.5</i>	<i>244.4</i>	<i>34.1</i>	<i>262.5</i>	<i>35.1</i>	<i>254.4</i>	<i>39.3</i>	<i>248.8</i>	<i>42.7</i>	<i>242.0</i>	<i>34.4</i>	<i>260.9</i>
Beta MDA 90-sec <i>dpm</i> count time	<i>27.5</i>	<i>244.4</i>	<i>34.1</i>	<i>262.5</i>	<i>35.1</i>	<i>254.4</i>	<i>39.3</i>	<i>248.8</i>	<i>42.7</i>	<i>242.0</i>	<i>34.4</i>	<i>260.9</i>

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Survey Area: NA	Survey Unit: INT/EXT	Building: B331A
Survey Unit Description Roof, Walls, Ceiling		

INSTRUMENT DATA SHEET

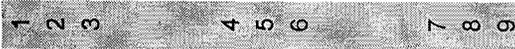
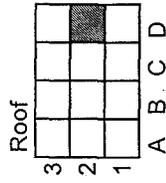
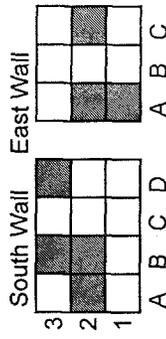
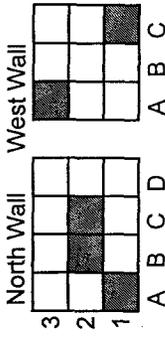
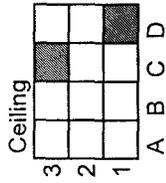
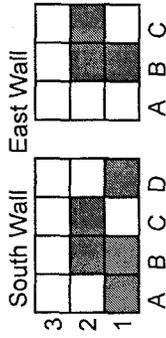
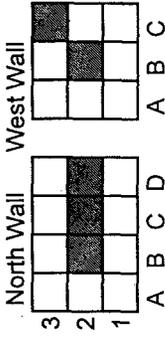
Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6
Serial #						
Cal. Due Date			NA			
Analysis Date				NA		
Instrument Bkg ^{cpm} 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time ^{dpm}						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	13 ^{72 Series}		14 ^{83 Series}		9	10	11	12	
Serial # / Probe #	2376	1921	2378	1956					
Cal. Due Date	8-23-00		5-3-00				NA		
Survey Date	3-10-00		3-10-00						
Alpha Bkg 90-sec ^{cpm} count time	2.0		411		0.7	459			
Beta Bkg 90-sec ^{cpm} count time									
Alpha Eff (%)	20.46		29.70		22.35	30.36			
Beta Eff (%)									
Alpha MDA 90-sec ^{dpm} count time	35.1		265.4		22.3	276.0			
Beta MDA 90-sec ^{dpm} count time									

331A - Interior



X-Coordinate	Y-Coordinate
6	8

= one square meter
 = direct & swipe

Total Surface Area = 108 m²
 10% Surface Area = 10.8 m²

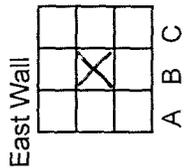
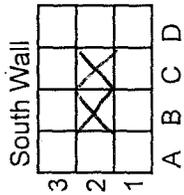
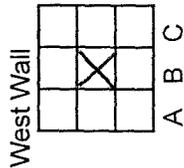
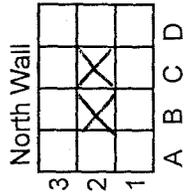
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2	14	3	12	2	5	22	11	8
3	12	1	13	14	5	23	12	5
4	2	6	14	4	9	24	6	5
5	4	2	15	9	4	25	3	7
6	12	6	16	2	2	26	4	6
7	3	2	17	6	6	27	1	6
8	3	5	18	9	2	28	6	2
9	9	5	19	10	2			
10	8	3	20	7	1			

48 14
 3-408

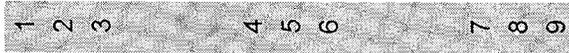
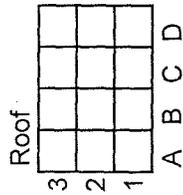
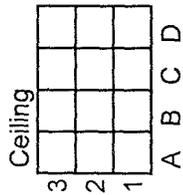
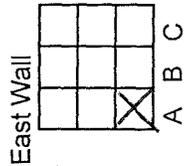
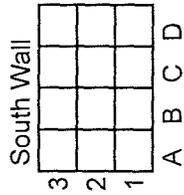
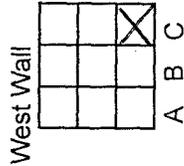
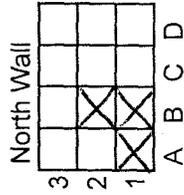
477

SEAD LOCATIONS:

331A - Interior



331A - Exterior



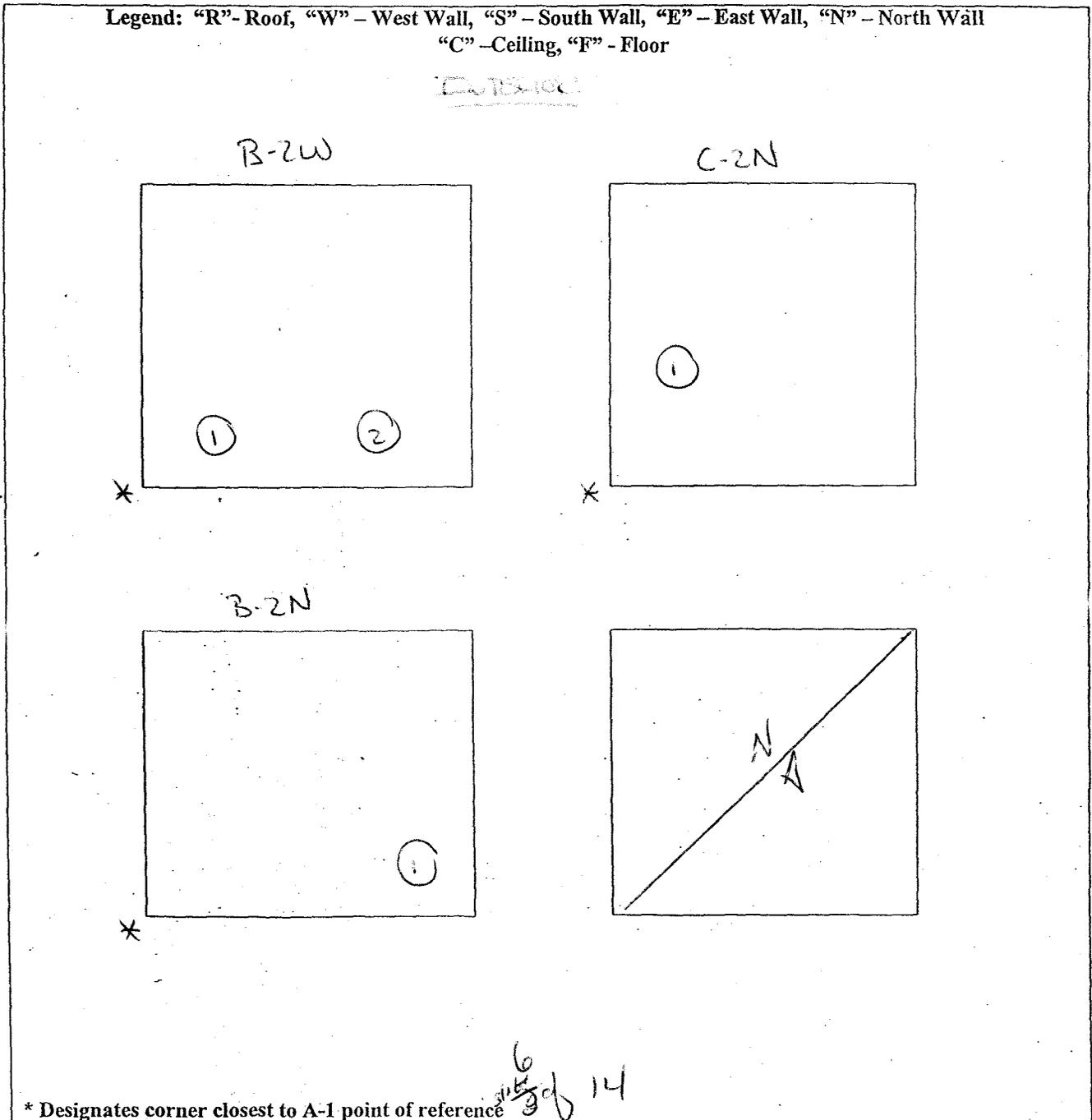
3-409

418

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: N/A	Survey Unit: INTERIOR	Building: B331A
Survey Unit Description: WALLS, CEILING		
RCT Initials/Date: JAC / 3.4.04	RCT Initials/Date: JAC	RCT Initials/Date: JAC

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.



Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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3410

Final Survey NE Electra Scan & Investigation Survey Map

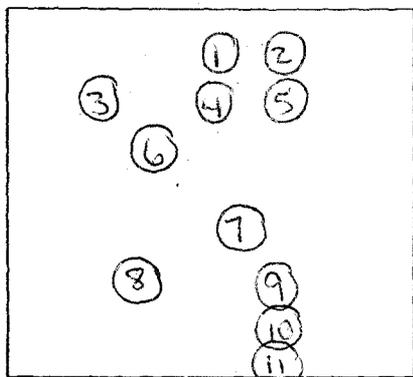
Survey Area: NA	Survey Unit: EXTERIOR	Building: B331A
Survey Unit Description: WALLS		
RCT Initials/Date: NA 3/11/00	RCT Initials/Date: NA 3-4-00	RCT Initials/Date: NA

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

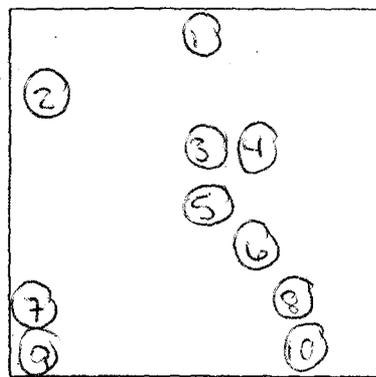
**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**

EXTERIOR

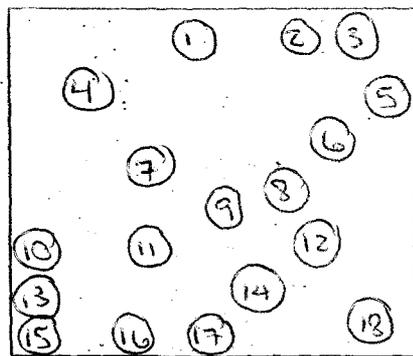
A-IN



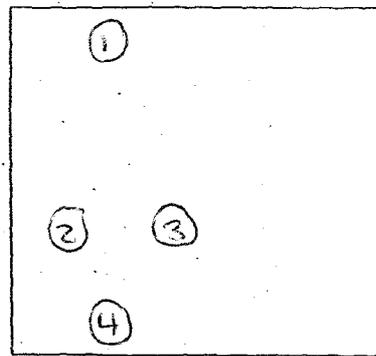
B-IN



B-2N



A-1E



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

7
3/11/00
14

3-411

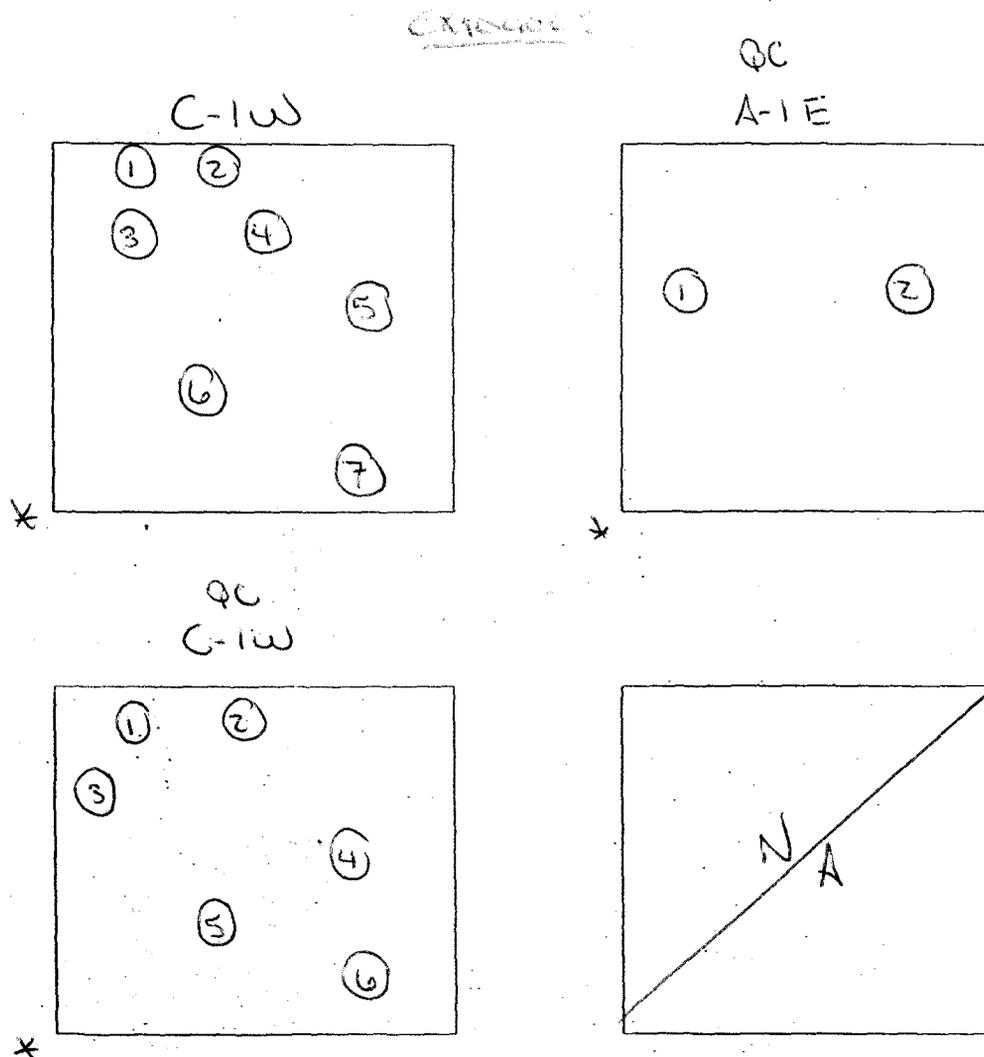
420

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: NA	Survey Unit: EXTERIOR	Building: B331A
Survey Unit Description: WALLS / QC SCANS		
RCT Initials/Date: BJP 3/10/03	RCT Initials/Date: me 3/10/03	RCT Initials/Date: BJP

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

8/14

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

3-412

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Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: NA		Survey Unit: INT/EXT			Building: B331A				
Survey Unit Description: WALL, Ceiling SCANS									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
INTERIOR									
B2W1		11	N			11	Y	8	
B2W2		11	N			11	Y	12	
C2S		11	N			11	N	NA	
B2S		11	N			11	N	NA	
C2N1		11	N			11	Y	12	
B2N1		11	N			11	Y	2	
B2E		11	N			11	N	NA	
EXTERIOR									
A1N1		12	N			12	Y	18	
A1N2		12	N			12	Y	16	
A1N3		12	N	NA		12	Y	22	NA
A1N4		12	N			12	Y	20	
A1N5		12	N			12	Y	14	
A1N6		12	N			12	Y	20	
A1N7		12	N			12	Y	12	
A1N8		12	N			12	Y	28	
A1N9		12	N			12	Y	32	
A1N10		12	N			12	Y	20	
A1N11		12	N			12	Y	12	
B1N1		12	N			12	Y	14	
B1N2		12	N			12	Y	36	
B1N3		12	N			12	Y	20	
B1N4		12	N			12	Y	20	
B1N5		12	N			12	Y	12	
B1N6		12	N			12	Y	20	
B1N7		12	N			12	Y	18	

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9/21/14 3-413

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: N/A		Survey Unit: EXTERIOR			Building: B331A				
Survey Unit Description: Wall Ceiling SCANS									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
B-1N8		12	N			12	Y	18	
B-1N9		12	N			12	Y	10	
B-1N10		12	N			12	Y	10	
B-2N1		12	N			12	Y	24	
B-2N2		12	N			12	Y	32	
B-2N3		12	N			12	Y	36	
B-2N4		12	N			12	Y	22	
B-2N5		12	N			12	Y	14	
B-2N6		12	N			12	Y	34	
B-2N7		12	N			12	Y	30	
B-2N8		12	N	NA		12	Y	36	NA
B-2N9		12	N			12	Y	28	
B-2N10		12	N			12	Y	30	
B-2N11		12	N			12	Y	30	
B-2N12		12	N			12	Y	18	
B-2N13		12	N			12	Y	22	
B-2N14		12	N			12	Y	24	
B-2N15		12	N			12	Y	26	
B-2N16		12	N			12	Y	32	
B-2N17		12	N			12	Y	24	
B-2N18		12	N			12	Y	34	
A-1E1		13	N			13	Y	4	
A-1E2		13	N			13	Y	4	
A-1E3		13	N			13	Y	8	
A-1E4		13	N			13	Y	6	
C-1W1		13	N			13	Y	36	

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10 9/20/14 3-44

Survey Area: NA	Survey Unit: EXT/INT	Building: B331A
Survey Unit Description Walls, Roof, Ceiling		

Removable Contamination Data Sheet

EXTERIOR
INTERIOR
C-3C

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
A-IN		1	2	1.0	34.0	0.5	-6.0	1.5	-24
B-2N		1	2	2.0	40.0	1.5	0.0	4.5	0.0
C-2N		1	2	0.0	42.5	-0.5	2.5	-1.5	10
A-3W		1	2	0.0	37.5	-0.5	-2.5	-1.5	-10
C-1W		1	2	1.0	37.0	0.5	-3.0	1.5	-12
A-2S		1	2	1.0	37.0	0.5	-3.0	1.5	-12
B-2S		1	2	1.5	47.0	1.0	7.0	3.0	28
B-3S		1	2	2.5	39.5	2.0	-0.5	6.0	-2
D-3S		1	2	2.0	43.5	1.5	3.5	4.5	14
A-1E		1	2	0.5	33.5	0.0	-1.5	0.0	-6
A-2E		1	2	1.5	37.0	1.0	-3.0	3.0	-12
C-2E		1	2	2.0	32.5	1.5	-1.5	4.5	-6
D-2E		1	2	0.5	37.0	0.0	-3.0	0.0	-12
B-2N		4	6	0.0	44.0	-0.5	3.0 ^{34/6}	-1.5	12 ^{34/6}
C-2N		3	5	0.0	39.5	-0.5	0.5 ^{34/6}	-1.5	2.0 ^{34/6}
D-2N		4	6	1.0	42.0	0.5	1.0	1.5	4
B-2W		3	5	2.0	40.5	1.5	1.5	4.5	6
C-3W		4	6	0.5	41.0	0.0	0.0	0.0	0.0
A-1S		4	6	0.0	39.0	-0.5	-2.0	-1.5	-8
B-1S		3	5	0.5	39.0	0.0	0.0	0.0	0.0
B-2S		4	6	1.0	41.0	0.5	0.0	+1.5	0.0
C-2S		3	5	0.0	39.5	-0.5	0.5	-1.5	2
D-1S		4	6	0.0	36.5	-0.5	-4.5	-1.5	-18
B-1E		3	5	1.0	32.0	0.5	-1.0 ^{34/6}	1.5	-4 ^{34/6}
B-2E		4	6	0.5	40.5	0.0	0.5 ^{34/6}	0.0	2 ^{34/6}
C-2E		3	5	0.5	32.0	0.0	0.5 ^{34/6}	0.0	4 ^{34/6}
C-3C		3	5	0.5	43.0	0.0	4.0	0.0	16
D-1C		3	5	0.5	40.5	0.0	1.5	0.0	6

NA
A

427

Survey Area: <i>N/A</i>	Survey Unit: <i>N/A</i>	Building: <i>B-331A</i>
Survey Unit Description <i>ROOF, WALLS, CEILING & FLOORS OF B-331A (INVESTIGATION)</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

	<i>Tom Buchanan</i> RCT Printed Name		<i>[Signature]</i> RCT Signature	<i>2-29-05</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date

Quality Control Measurements Performed By

	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date
	<i>N/A</i> RCT Printed Name		<i>N/A</i> RCT Signature	<i>N/A</i> Date

Survey Reviewed By

<i>Row Worum</i> RCT Foreman Printed Name		<i>[Signature]</i> RCT Foreman Signature	<i>6/20/05</i> Date
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Survey Area: N/A	Survey Unit: INT/EXT	Building: B331A
Survey Unit Description ROOF, WALLS, CEILINGS & FLOORS OF B331A.(INVESTIGATION).		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE				
Model	SAC-4	BC-4				
Inst. ID #	1	2	3	4	5	6
Serial #	823	966				
Cal. Due Date	9/6/00	9/15/00				
Analysis Date	5/24/00	5/24/00				
Instrument Bkg. <i>cpm</i> 10-min count time	0.5	40.9				
Instrument Eff (%)	33	25				
Instrument MDA <i>dpm</i> 1-min count time	15.6	70.6	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.							
Model	Electra		Electra		Electra							
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2385	1931										
Cal. Due Date	6/14/00											
Survey Date	5/24/00											
Alpha Bkg 90-sec <i>cpm</i> count time	Beta Bkg 90- sec count time <i>cpm</i>	2.7	355									
Alpha Eff (%)	Beta Eff (%)	21.3	29.49									
Alpha MDA 90-sec <i>dpm</i> count time	Beta MDA 90-sec <i>dpm</i> count time	48.6	306	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Survey Area: J/A	Survey Unit: EXISTING	Building: B331A
Survey Unit Description: 1 PINE TREE INVESTIGATION OF B331A		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

	ROBERT KEUCY			3-11-00
	RCT Printed Name		RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	NA	
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	NA	
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date
	RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

ROBERT WORTER			3-13-00
RCT Foreman Printed Name		RCT Foreman Signature	Date

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Survey Area: <i>N/A</i>	Survey Unit: <i>EXTERNAL</i>	Building: <i>BSS1A</i>
Survey Unit Description: <i>1 Point Probe Investigation of BSS1A</i>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6
Serial #						
Cal. Due Date				<i>N/A</i>		
Analysis Date				<i>4</i>		
Instrument Bkg 10-min count time <i>cpm</i>						
Instrument Eff (%)						
Instrument MDA 2-min count time <i>dpm</i>						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	7		8		9		10	11	12
Serial # / Probe #	<i>2376</i>	<i>1921</i>							
Cal. Due Date	<i>8-23-00</i>								
Survey Date	<i>3-11-00</i>								
Alpha Bkg 90-sec count time	Beta Bkg 90-sec count time								
	<i>2.7</i>	<i>451</i>							
Alpha Eff (%)	Beta Eff (%)								
	<i>20.46</i>	<i>21.7</i>							
Alpha MDA 90-sec count time	Beta MDA 90-sec count time								
	<i>39.3</i>	<i>278</i>							

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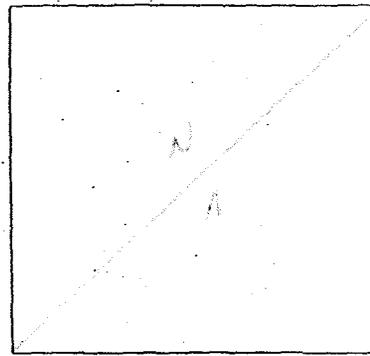
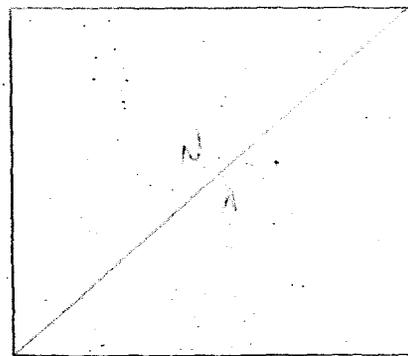
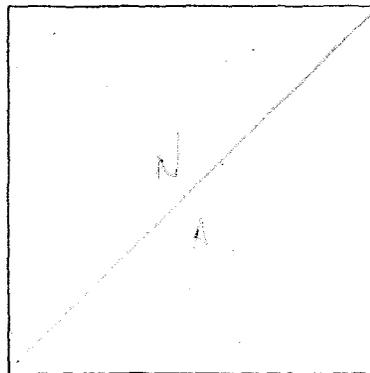
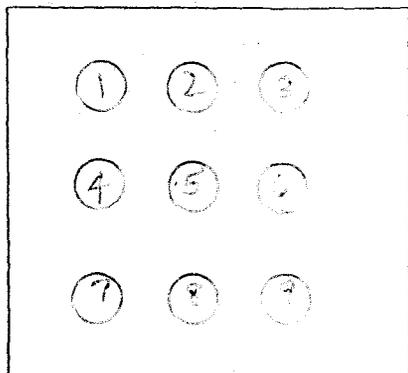
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: N/A	Survey Unit: EXTERIOR	Building: B331A
Survey Unit Description: 9-POINT INVESTIGATION		
RCT Initials/Date: JH/3.11.02	RCT Initials/Date: N/A	RCT Initials/Date: N/A

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R" - Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**

D-2 R



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

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2 of 4 2.11.02

Survey Area: <i>N/A</i>	Survey Unit: <i>100</i>	Building: <i>100</i>
Survey Unit Description <i>Box Exterior</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>Tom Bingham</i>		<i>[Signature]</i>	<i>1/1/00</i>
RCT Printed Name		RCT Signature	Date
<i>N/A</i>		<i>N/A</i>	<i>N/A</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>N/A</i>		<i>N/A</i>	<i>N/A</i>
RCT Printed Name		RCT Signature	Date

Quality Control Measurements Performed By

<i>Archie Porter</i>		<i>[Signature]</i>	<i>1/1/00</i>
RCT Printed Name		RCT Signature	Date
<i>N/A</i>		<i>N/A</i>	<i>N/A</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>↓</i>		<i>↓</i>	<i>↓</i>
RCT Printed Name		RCT Signature	Date
<i>N/A</i>		<i>N/A</i>	<i>N/A</i>
RCT Printed Name		RCT Signature	Date

Survey Reviewed By

<i>Don Walker</i>	<i>436</i>	<i>[Signature]</i>	<i>6-12-00</i>
RCT Foreman Printed Name	Employee #	RCT Foreman Signature	Date

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1 4 3427

Survey Area: N/A	Survey Unit: EXTERIOR	Building: B331A
Survey Unit Description		
ROOF EXTERIOR		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

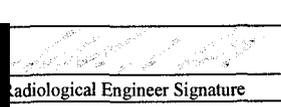
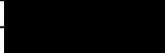
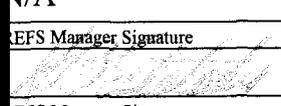
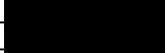
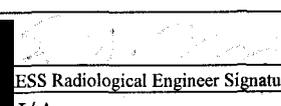
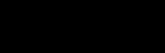
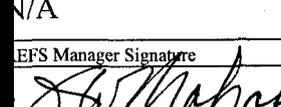
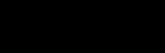
Manufacturer	EBERLINE	EBERLINE				
Model	SAC-4	BC-4				
Inst. ID #	1	2	3	4	5	6
Serial #	1158	961				
Cal. Due Date	8/15/00	6/27/00				
Analysis Date	6/1/00	6/1/00				
Instrument Bkg. ^{cpm} 10-min count time	0.1	42.9				
Instrument Eff (%)	33	25				
Instrument MDA ^{dpm} 1-min count time	11.5	72.2	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.							
Model	Electra		Electra		Electra							
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2376	1921										
Cal. Due Date	8/23/00											
Survey Date	6/1/00											
Alpha Bkg 90-sec ^{cpm} count time	Beta Bkg 90- sec count time ^{cpm}	4.7	773									
Alpha Eff (%)	Beta Eff (%)	20.46	29.7									
Alpha MDA 90-sec ^{dpm} count time	Beta MDA 90-sec ^{dpm} count time	62.5	445	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

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SURVEY PACKAGE COVER SHEET

Package ID: 2000-01		Building: 987	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.			
Building Information:			
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
Building Type: Type 1 <input checked="" type="checkbox"/> Type 2 <input type="checkbox"/> Type 3 <input type="checkbox"/>			
Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>			
Contaminants of Concern: Plutonium <input checked="" type="checkbox"/> Uranium <input checked="" type="checkbox"/> Other <input type="checkbox"/> _____			
Justification for Classification: This facility has no known history of radiological contamination.			
Special Support Requirements: Ladder, manlift, scaffolding, and/or remote reach tools and instrumentation may be required for surveying in overhead areas. Overhead areas include upper walls and ceilings on the interior and upper walls and roof on exterior.			
Special Safety Precautions: Access to overhead areas may require additional controls. Use caution when working in overheads.			
Isolation Controls:			
Level 1 <input type="checkbox"/> Level 2 <input checked="" type="checkbox"/> N/A <input type="checkbox"/>			
Labeling Requirements: The location where fixed and removable surveys are performed will be marked using a sticker or a marker and then cross-referenced to the survey results.			
Survey Package Implementation:			
RICK ROBERTS			
Radiological Engineer Printed Name		Radiological Engineer Signature	Date <i>11-28-00</i>
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS			
RESS Manager Printed Name		RESS Manager Signature	Date <i>8-14-00</i>
Survey Package Closure:			
RICK ROBERTS <i>8/14/00</i>			
RESS Radiological Engineer Printed Name		RESS Radiological Engineer Signature	Date <i>8-14-00</i>
NOT APPLICABLE		N/A	
REFS Manager Printed Name		REFS Manager Signature	Date
H. B. ESTABROOKS <i>8/14/00</i>			
RESS Manager Printed Name		RESS Manager Signature	Date <i>8-14-00</i>

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SURVEY PACKAGE CORRECTION/CHANGE HISTORY FORM

Package ID: 2000-01		Building: 987	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Change #	Description	Initiator/ Date	PRE
1	a) Incorporate requirements of Letter Recommendation dated 2/8/00 (See p. 2 of 2000)	KDM 2/11/00	ds
	b) Incorporate requirements of Letter Recommendation dated 2/14/00 (See p. 2 of 2000)		
	c) Incorporate revision 2 to Survey map. Signs under delineated area with dimensions 2' x 12' noted		
	d) 50% of total scan area shall be on the interior and 50% on the exterior. 50% of the exterior scan area shall be on the roof.		
2	Survey map revised to reflect correct area	KDM 5/5/00	ds
3	9 point roof investigations performed on 3-13-00 at A-1R and 6-5-00 at A-2R. No sampling required, roof is flat	KDM 6/5/00	ds
4	Corrected scan requirement	KDM 7/1/00	ds

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INITIAL SURVEY PACKAGE DESIGN FORM

Package ID: 2000-01		Building: 987		Type: 1	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior		Area (m ²): 56	
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input checked="" type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input checked="" type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
28	0	0	0	0	Biased
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans
Building:		Type:		Survey Area:	
Survey Unit:			Area (m ²):		
Survey Unit Description:					
Survey Type: RLC Survey <input type="checkbox"/> FSS <input type="checkbox"/>			Classification: Class 1 <input type="checkbox"/> Class 2 <input type="checkbox"/> Class 3 <input type="checkbox"/> Unknown <input type="checkbox"/>		
Random/Uniform Surface Activity Measurements	Biased Surface Activity Measurements	Equipment Surface Activity Measurements	Media Samples	Volumetric Samples	Surface Activity Scans

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM

Package ID: 2000-01		Building: 987
Survey Area: Not Applicable		Survey Unit: Interior/Exterior
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Activity Measurements	<p>INTERIOR & EXTERIOR SURFACES: 28 surveys will be taken per the attached survey map.</p> <p><u>QUALITY ASSURANCE SURVEYS</u></p> <p>INTERIOR & EXTERIOR SURFACES: 5 surveys will be taken per direction from radiological engineering.</p>	<p>SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6</p>

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01		Building: 987
Survey Area: Not Applicable		Survey Unit: Interior/Exterior
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.		
Minimum Survey/Sampling Measurement Requirements		
Measurement	Number and Type	Comments
Surface Scanning	INTERIOR & EXTERIOR SURFACES: Biased surface scans will be performed on the interior floors in areas where contamination would accumulate. This includes seams, cracks, corners, doorways and boundaries between different types of flooring. Biased surface scans will be performed on the exterior where contamination would accumulate. This includes seams, cracks and corners. Both the exterior walls and roof will be scanned. Change #4 emy 9/11/00 No more ^{less} than 10% of the total area will be scanned.	SEE NOTE 1 SEE NOTE 2 SEE NOTE 3 SEE NOTE 4 SEE NOTE 5 SEE NOTE 6
Media Samples	NONE	
Volumetric Samples	NONE	
Isotopic Gamma Scans	NONE	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: 987
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
<p>Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.</p>	
<p>Survey/Sampling Instructions</p>	
<p>NOTE 1: Surveys of the area were established on a random basis and are delineated on page 14, RSFORMS-16.01-10, of the survey package. Survey points will be taken in the middle of the survey grid and will be cross-referenced to a common reference point in the trailer. These surveys will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures", for the following:</p> <ul style="list-style-type: none"> • Total alpha contamination • Total beta contamination • Removable alpha contamination • Removable beta contamination • Biased scan measurements for alpha then beta/gamma contamination <p>For total alpha and total beta surveys, the LAB will be determined at each survey point by placing a piece of plywood over the probe face that is at least 0.5 inch thick and performing an alpha count and a beta count. The material background for both total alpha surveys and total beta surveys will be considered to be 0 dpm/100 cm².</p> <p>Alpha scanning using the NE Electra for the DP6-BD and DP8A probes will be in accordance with Letter SJR-001-99, "Alpha Scan Rates for Building 779 Cluster Final Status Surveys," and Letter SJR-004-99, "Performance of Scan Surveys with the Bicon/NE DP8 Probe for Building 779 Cluster Final Status Surveys," respectively. Beta scanning using the NE Electra.</p> <p>NOTE 2: Quality assurance prescribed surveys of the area will be taken in accordance with PRO-476-RSP-16.02, "Radiological Surveys of Surfaces and Structures" per the requirements in PRO-479-RSP-16.05, "Radiological Survey/Sample Quality Control," for the following:</p> <ul style="list-style-type: none"> • Direct alpha contamination • Direct beta contamination • Scan measurements for alpha then beta/gamma contamination <p>The location of quality assurance surveys will be delineated by radiological engineering after the initial surveys are performed. Quality assurance surveys will be performed by a different individual than performed the original survey.</p> <p>NOTE 3: The RCT shall document the results for all surveys performed and maintain with the survey instructions package.</p> <p>NOTE 4: All survey instruments will be performance checked both prior to and after performing surveys, and both performance checks will be documented. Contact Radiological Engineering for direction if an instrument fails the post performance check.</p>	

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SURVEY PACKAGE SURVEY/SAMPLING INSTRUCTIONS FORM (cont)

Package ID: 2000-01	Building: 987
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.	
Survey/Sampling Instructions	
<p>NOTE 5: The following MDA requirements are a goal for each survey instrument. The MDA shall not exceed the Investigation Levels outlined in NOTE 6.</p> <ul style="list-style-type: none"> • 10 dpm/100 cm² for removable alpha contamination • 50 dpm/100 cm² for total alpha contamination • 500 dpm/100 cm² for removable beta contamination • 2500 dpm/100 cm² for total beta contamination • 150 dpm/100 cm² for alpha scan • 7500 dpm/100 cm² for beta scan <p>NOTE 6: If a survey result exceeds the following investigation levels, contact radiological engineering before proceeding:</p> <ul style="list-style-type: none"> • 15 dpm/100 cm² for removable alpha contamination • 75 dpm/100 cm² for total alpha contamination • 750 dpm/100 cm² for removable beta contamination • 3750 dpm/100 cm² for total beta contamination • 225 dpm/100 cm² for alpha scan • 11250 dpm/100 cm² for beta scan <p>An investigation will be performed into the elevated results.</p>	

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SURVEY PACKAGE CALCULATION WORKSHEET

Package ID: 2000-01	Building: 987
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.	
<input checked="" type="checkbox"/> Total Surface Activity <input type="checkbox"/> Media Surface Activity	
<input checked="" type="checkbox"/> Removable Surface Activity <input type="checkbox"/> Volumetric Surface Activity	
<p>Step 1: Calculate the relative shift Δ/σ_s.</p> $\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$ $\Delta/\sigma_s = 1.0$ <p>where: A value of 1.0 was chosen since no survey data is available and Δ/σ_s may vary between 1.0 and 3.0. The use of 1.0 maximizes the number of surveys required.</p> <p>Step 2: Determine Sign p using the calculated relative shift and Table 7-1. Sign p is the estimated probability that a random measurement from the survey unit will be less than the $DCGL_w$ when the survey unit median is actually at the LBGR. Sign p = 0.841345</p> <p>Step 3: Determine Decision Error Percentiles for $Z_{1-\alpha}$ and $Z_{1-\beta}$ and the selected decision error levels α and β. Typical (α) and (β) values used at RFETS are 0.05 and 0.05 respectively. This yields a $Z_{1-\alpha}$ and $Z_{1-\beta}$ value of 1.645 and 1.645 respectively.</p> <p>Step 4: Calculate Number of Data Points (N) for Sign Test using the following equation:</p> $N = \frac{(Z_{1-\alpha} + Z_{1-\beta})^2}{4(\text{Sign } p - 0.5)^2} = 23.22$ <p>Step 5: Increase the number of data points by 20% to ensure sufficient power of the tests and to allow for possible data losses. $23.22 * 1.2 = 27.86$</p> <p>Conclusion:</p> <p>A total of 28 data points will be needed to satisfy MARSSIM statistical requirements.</p>	
RICK ROBERTS	
Project RE Printed Name	Project RE Signature
H.B. ESTABROOKS	
RESS RE Printed Name	RESS RE Signature
	Date

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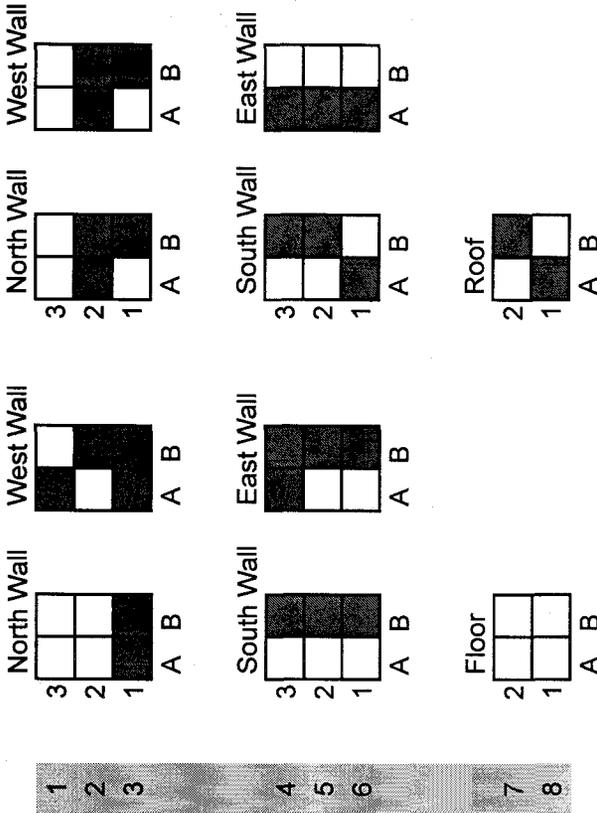
451

SURVEY PACKAGE SURVEY MAP

Package ID: 2000-01	Building: 987
Survey Area: Not Applicable	Survey Unit: Interior/Exterior
Survey Unit Description: Building 987 was constructed in approximately 1960. This building is located Southeast of Building 993, near the Bunker Storage. The size of Building 987 is approximately 9' 4" long by 7' 4" wide and approximately 9 feet high.	
Floor Area (m²): 4	Total Area (m²): 56
SEE ATTACHED SURVEY MAP	

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Bldg. 987 Interior **Bldg. 987 Exterior**



*Spaced
 1000 Meters*

1	8	2	11	4	21	6	2
2	6	7	12	5	8	6	4
3	2	4	13	4	6	3	3
4	5	7	14	5	2	2	5
5	3	4	15	7	5	5	6
6	4	3	16	4	5	2	3
7	4	2	17	4	4	3	1
8	6	3	18	1	3	2	6
9	7	6	19	6	5		
10	7	2	20	8	3		

1	2	3	4	5	6	7	8
X-Coordinate				Y-Coordinate			
5				3			

Total Surface Area = 56 m²
 10% Scan Surface Area = 6 m²

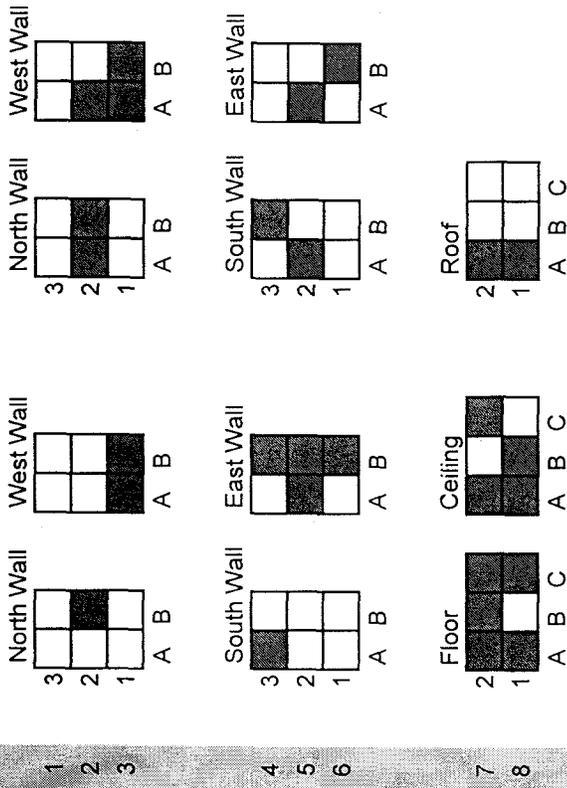
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Bldg. 987 Interior

Bldg. 987 Exterior



X-Coordinate	Y-Coordinate
2	4

□ = one square meter
 ■ = direct & swipe

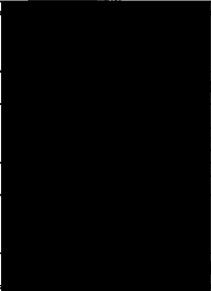
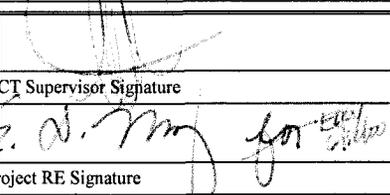
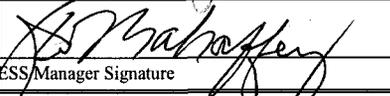
Total Surface Area = 66 m²
 10% Surface Area = 6.6 m²

1	7	2	11	7	7	21	10	3
2	4	3	12	3	7	22	11	6
3	2	7	13	8	4	23	1	4
4	4	7	14	5	8	24	3	8
5	10	5	15	4	8	25	5	3
6	8	2	16	6	7	26	11	3
7	5	6	17	7	8	27	5	4
8	10	2	18	2	2	28	5	5
9	1	7	19	7	5			
10	4	5	20	1	8			

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SURVEY PACKAGE VALIDATION CHECKLIST FORM

Package ID: 2000-01		Building: 987	
Survey Area: Not Applicable		Survey Unit: Interior/Exterior	
Survey Type: Reconnaissance Level Characterization Survey <input type="checkbox"/> Final Status Survey <input checked="" type="checkbox"/>			
All Documentation Reviewed for Completion		RCT Supervisor	PRE
Scan Surveys		<i>N</i>	<i>EDM</i>
Total Activity Surveys		<i>N</i>	<i>EDM</i>
Exposure Rate Surveys		<i>N/A</i>	<i>N/A</i>
Removable Surveys		<i>N</i>	<i>EDM</i>
Media Samples		<i>N/A</i>	<i>N/A</i>
Volumetric Samples		<i>N/A</i>	<i>N/A</i>
All Surveys and Samples Accounted For		RCT Supervisor	PRE
Scan Surveys		<i>N</i>	<i>EDM</i>
Total Activity Surveys		<i>N</i>	<i>EDM</i>
Exposure Rate Surveys		<i>N/A</i>	<i>N/A</i>
Removable Surveys		<i>N</i>	<i>EDM</i>
Media Samples		<i>N/A</i>	<i>N/A</i>
Volumetric Samples		<i>N/A</i>	<i>N/A</i>
Comments:			
<i>Zoo Waste</i> RCT Supervisor Printed Name		 RCT Supervisor Signature	
RICK ROBERTS <i>7/11/02</i> per D. McKamey Project RE Printed Name		 Project RE Signature	
H. B. ESTABROOKS <i>8/14/00</i> J. W. Mahaffey RESS Manager Printed Name		 RESS Manager Signature	
		Date 6-12-00 Date 8-14-00 Date	

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(09/30/99)

APPENDIX A

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DQA Checklist

§	Item	Performed By (Initials/Date)	Comments (number & attach)
7.1	Data Verification	KRM / 6-2-00	
7.1[1]	DQOs implemented as prescribed	KRM / 6-2-00	
7.1[2]	All required supporting documents present	KRM / 6-2-00	
7.1[3]	Outliers / anomalies addressed	KRM / 6-2-00	
7.2	Data Validation	KRM / 6-2-00	
7.2.1	Survey/Sample Precision	KRM / 6-2-00	see spreadsheets
7.2.2	Survey Accuracy	KRM / 6-2-00	
	Sample Accuracy	N/A	no samples taken
7.2.3	Data Representative of survey unit	KRM / 6-2-00	yes
7.2.4	Survey/Sample/Scan Completeness	KRM / 6-2-00	100%
7.2.5	Data Comparable to related units	KRM / 6-2-00	yes, Group B
7.3	DQA complete	KRM / 6-2-00	yes, see spreadsheets
7.3[3]	Any measurement > DCGL _w ?	N/A	
7.3[4]	Mean > DCGL _w	N/A	
7.3[5]	Any measurement > maximum DCGL	N/A	
7.4	Evaluation	N/A	
7.4[1][D]	New survey package (if req'd)	N/A	
7.4[1][E]	Radiological improvement report (if req'd)	N/A	
7.4[2]	Verify documentation complete	N/A	
8.0	Peer review	JL 6/13/00	NONE
	Package submitted to project management	KRM 6-2-00	
9.1	Records to Records Center (copy to project files)	KRM / 8-22-00	

NOTE: The DQA Flow Chart (Appendix B) is provided as aid to illustrate the DQA process when performing survey/sample data analysis activities describe in this procedure.

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Survey Area: N/A
Survey Unit: Interior/Exterior
Building: B987
Survey Unit Description: Roof, walls, floors and ceiling of B987

8. POST-PERFORMANCE ACTIVITIES

8.1 Documentation

Reviewed the above mentioned Survey Package and associated measurement data in accordance with PRO-478RSP-16.04, Radiological Survey/Sample Data Analysis. The following items are noted:

1. Various notes are provided on the Survey Package DQA Checklist. See DQA Checklist.
2. DQA Checklist should have location to input Survey Area, Survey Unit, Building and Survey Unit Description to ensure improved tracking.
3. Section 7.2.2 Accuracy, of RSP-16.04 should be rewritten to provide usable accuracy analysis process. Interoffice Memorandum REVISION TO PRO-478-RSP-16.04, RADIOLOGICAL SURVEY/SAMPLE DATA ANALYSIS – EDM-001-00 was written and concurred on to provide a usable accuracy analysis process.
4. Spreadsheets provided to perform statistical calculations.
5. Several forms have been generated to replace forms from RSP-16.02. RSP-16.02 should be revised to reflect this change/improvement.
6. Total number of data points is very conservative. Using MARSSIM guidance it can be shown that significantly less data points are statistically acceptable. See spreadsheets.
7. Survey maps need improvement. Methodology employed is one that was used prior to RSP-16.01 approval. Recommend scale maps with grid overlays or CAD drawing in the future. See B779 Closure Project maps as examples.

Prepared by:

S. W. King 6/2/00

Removable Activity
(dpm/100 cm²) Alpha

-1.2
0.0
-2.1
-1.2
0.0
0.9
-1.2
1.5
-2.1
-1.2
0.0
-1.5
0.3
-1.5
1.8
1.5
-1.2
0.0
-1.2
-1.5
3.3
1.5
1.8
1.5
-1.2
0.0
-1.2
4.5

Survey Unit - Interior/Exterior
Building - B987

Survey Unit Description - Roof, walls, ceiling and floors of B987

Removable Contamination Data Sheet

DCGL_w 20 dpm/100 cm²

n 28

Mean 0.0 dpm/100 cm²

Std Dev 1.7 dpm/100 cm²

No measurement exceeds the DCGL_w

**Removable Activity
(dpm/100 cm²) Beta**

-17.2
-11.6
-3.6
8.8
-27.6
-35.6
-23.2
-23.6
14.4
34.8
-25.6
28.0
-3.2
10.0
-41.2
-2.0
-13.2
-14.0
-5.2
-24.0
-3.2
8.0
14.8
50.0
26.8
4.0
-3.2
52.0

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B987
Survey Unit Description - Roof, walls, ceiling and floors of B987
Removable Contamination Data Sheet
DCGL_w 1000 dpm/100 cm²
n 28
Mean -0.9 dpm/100 cm²
Std Dev 24.0 dpm/100 cm²
No measurement exceeds the DCGL_w

**Total Surface Activity
(dpm/100 cm²) Alpha**

32.7
30.0
8.9
8.9
35.8
12.4
-15.7
19.0
9.5
91.4
85.0
16.1
19.6
13.2
19.6
26.4
23.0
16.6
12.7
32.3
9.8
12.7
25.9
3.4
-9.6
-3.4
0.0
-6.2

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B987
Survey Unit Description - Roof, walls, ceiling and floors of B987
Total Surface Activity Data Sheet
DCGL_w 100 dpm/100 cm²
n 28
Mean 18.9 dpm/100 cm²
Std Dev 23.4 dpm/100 cm²

No measurement exceeds the DCGL_w
2 measurements exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
A-1W	8.9	-12.1	21	-1.6	-1312.5
B-1W	35.8	3.1	32.7	19.45	168.1234
B-2N	16.1	-5.8	21.9	5.15	425.2427
B-2E	16.6	14.8	1.8	15.7	11.46497
B-2F	12.7	14.8	-2.1	13.75	-15.27273

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta\sigma_s = (100-50)/23.4$
 $\Delta\sigma_s = 2.14$ (default 2.0)
 Sign p = 0.977250
 N = 11.88
 11.88*1.2 = 14.26
 N = 15

**Total Surface Activity
(dpm/100 cm²) Beta**

468
-412
359
369
514
-7
657
543
479
488
475
451
684
882
128
660
650
421
205
879
855
848
1017
356
-206
-119
-153
-94

Survey Area - N/A
Survey Unit - Interior/Exterior
Building - B987
Survey Unit Description - Roof, walls, ceiling and floors of B987
Total Surface Activity Data Sheet
DCGL_w 5000 dpm/100 cm²
n 28
Mean 407.0 dpm/100 cm²
Std Dev 370.9 dpm/100 cm²
No measurement exceeds the DCGL_w
No measurement exceeds 75% of the DCGL_w

Precision

Location	C ₁	C ₂	C ₁ -C ₂	(C ₁ +C ₂)/2	RPD
A-1W	684	958	-274	821	-33.37393
B-1W	882	754	128	818	15.64792
B-2N	451	534	-83	492.5	-16.85279
B-2E	421	698	-277	559.5	-49.50849
B-2F	848	985	-137	916.5	-14.94817

Precision (RPD) is out of specification due to low value survey measurements

Recalculated N

$\Delta/\sigma_s = (DCGL-LBGR)/\sigma_s$
 $\Delta/\sigma_s = (5000-2500)/370.9$
 $\Delta/\sigma_s = 6.74$ (default to 3)
 Sign p = 0.998650
 N = 10.88
 $10.88*1.2 = 13.05$
 N = 14

Survey Area: NIA	Survey Unit: INT./EXT.	Building: 987
Survey Unit Description ROOF, WALLS, CEILING, + FLOORS OF BUILDING 987		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

	EBERLINE					
Manufacturer	SAB	EBERLINE	EBERLINE	EBERLINE	EBERLINE	EBERLINE
Model	SAB4	SAB4	SAB4	EB4	EB4	EB4
Inst. ID #	1	2	3	4	5	6
Serial #	1171	1170	961	80220	80920	80901
Cal. Due Date	7-11-00	6-30-00	6-21-00	7-17-00	3-27-00	6-27-00
Analysis Date	3-4-00	3-4-00	3-4-00	3-4-00	3-4-00	3-4-00
Instrument Bkg cpm 10-min count time	0.9	0.5	0.7	30.0	41.9	35.9
Instrument Eff (%)	33	33	33	25	25	25
Instrument MDA 2-min count time dpm	11.4	9.6	10.6	68.9	91.4	69.8

Total Surface Activity Instrument Data

Manufacturer		N.E. Tech.		N.E. Tech.		N.E. Tech.		NE		NE		NE	
Model		Electra		Electra		Electra		ELECTRA		ELECTRA		ELECTRA	
Inst. ID #		7		8		9		10		11		12	
Serial # / Probe #		2378	1956	1395	1360	2376	1921	1315	1300	2526	1931	2578	1956
Cal. Due Date		5-3-00		7-19-00		8-23-00		7-19-00		8-23-00		5-3-00	
Survey Date		3-4-00		3-4-00		3-4-00		3-10-00		3-10-00		3-10-00	
Alpha Bkg 90-sec cpm count time	Beta Bkg 90-sec cpm count time	3.3	465	4	493	2.9	419	3.3	506	2	501	2	425
Alpha Eff (%)	Beta Eff (%)	22.35	30.56	21.03	29.85	20.46	29.70	20.29	20.05	20.46	20.70	22.35	30.56
Alpha MDA 90-sec dpm count time	Beta MDA 90-sec dpm count time	39.0	276	44.7	289	39.3	260	41.7	304	35.1	314	32.1	204

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Survey Area: <u>N/A</u>	Survey Unit: <u>101/010</u>	Building: <u>987</u>
Survey Unit Description: <u>Room 987 - 2000 bins, Cans, + Pails</u>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	<u>ESPEC</u>	<u>ESPEC</u>	<u>ESPEC</u>	<u>ESPEC</u>		
Model	<u>SAC-4</u>	<u>SAC-4</u>	<u>BC-4</u>	<u>BC-4</u>		
Inst. ID #	<u>13</u> ^{Acc} _{3/10/00}	<u>14</u> ² _{3/10/00}	<u>15</u> ³ _{3/10/00}	<u>16</u> ⁴ _{3/10/00}	<u>5</u>	<u>6</u> _{3/10/00}
Serial #	<u>1190</u>	<u>1171</u>	<u>BC620</u>	<u>BC669</u>		
Cal. Due Date	<u>6-30-00</u>	<u>7-11-00</u>	<u>3-27-00</u>	<u>7-12-00</u>		
Analysis Date	<u>3-10-00</u>	<u>3-10-00</u>	<u>3-10-00</u>	<u>3-10-00</u>	<u>N</u>	
Instrument Bkg ^{cpm} 10-min count time	<u>0.5</u>	<u>0.4</u>	<u>40.0</u>	<u>40.3</u>		<u>A</u>
Instrument Eff (%)	<u>33</u>	<u>33</u>	<u>25</u>	<u>25</u>		
Instrument MDA 2-min count time _{dpm}	<u>9.6</u>	<u>9.0</u>	<u>69.9</u>	<u>70.1</u>		

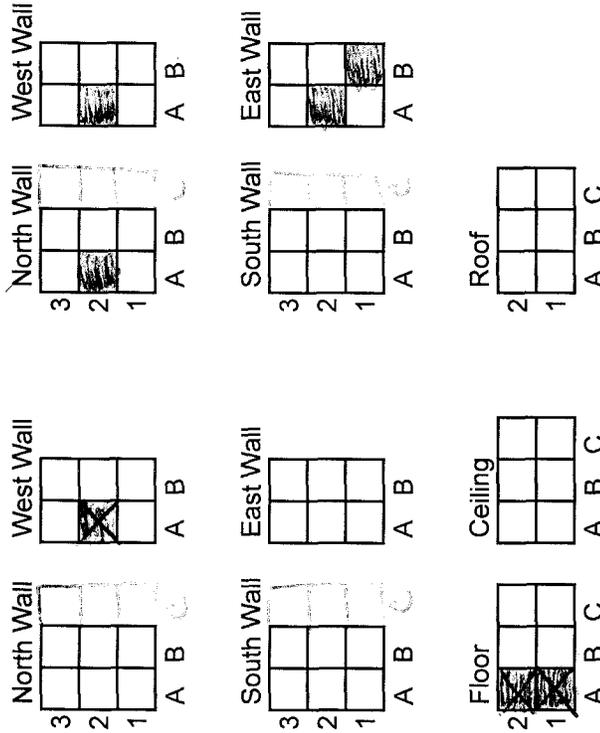
Total Surface Activity Instrument Data

Manufacturer	<u>N.E. Tech.</u>	<u>N.E. Tech.</u>	<u>N.E. Tech.</u>				
Model	<u>Electra</u>	<u>Electra</u>	<u>Electra</u>				
Inst. ID #	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>
Serial # / Probe #							
Cal. Due Date							
Survey Date							
Alpha Bkg 90-sec ^{cpm} count time							
Beta Bkg 90-sec ^{cpm} count time							
Alpha Eff (%)							
Beta Eff (%)							
Alpha MDA 90-sec ^{dpm} count time							
Beta MDA 90-sec ^{dpm} count time							

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SCAU LOCATIONS?

Bldg. 987 Interior Bldg. 987 Exterior



Note: Above location marked to Area N-100
Area South West

4 of 13
3-456

466

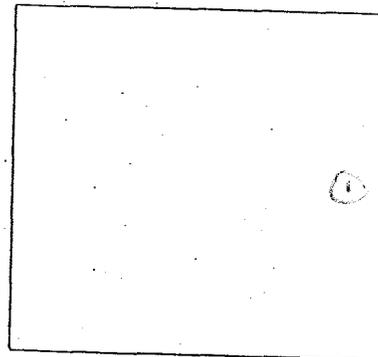
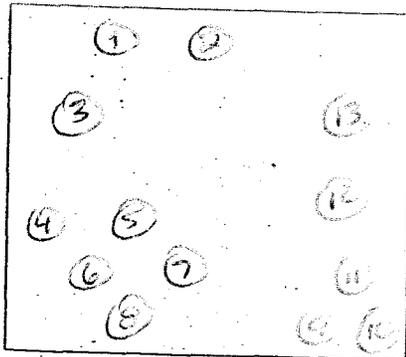
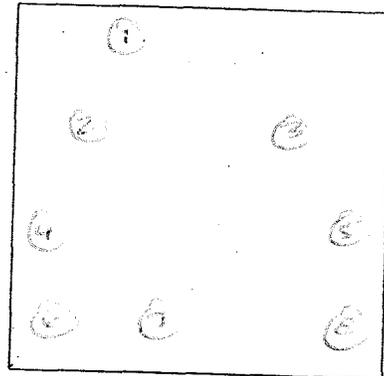
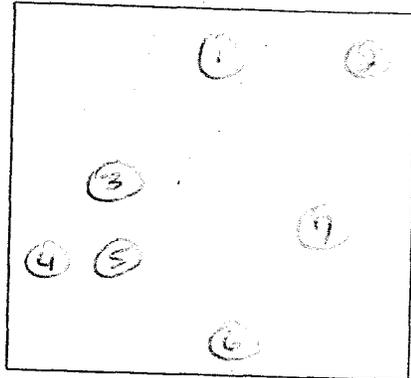
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>INT./EXT.</u>	Building: <u>457</u>
Survey Unit Description: <u>200 (457) INTERIORS & EXTERIORS SCANS</u>		
RCT Initials/Date: <u>MA 3-10-00</u>	RCT Initials/Date: <u>W 3-10-00</u>	RCT Initials/Date: <u>N/A</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

Legend: "R" - Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor

EXTERIORS



* Designates corner closest to A-1 point of reference

5 of 13

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

4/6/6

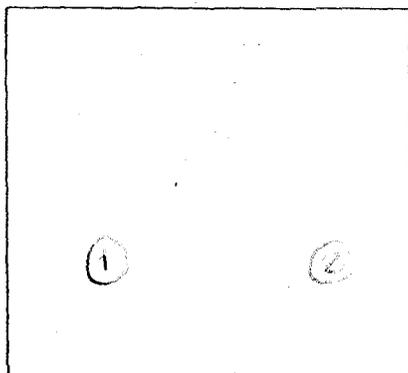
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>JIA</u>	Survey Unit: <u>INT. / EXT.</u>	Building: <u>467</u>
Survey Unit Description: <u>BLOC 457 INTERIORS & EXTERIORS SCANS</u>		
RCT Initials/Date: <u>MA 3-10-00</u>	RCT Initials/Date: <u>MA</u>	RCT Initials/Date: <u>MA</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

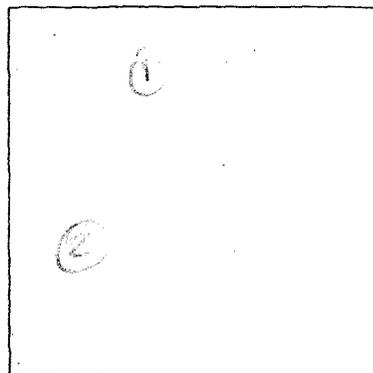
Legend: "R" - Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor

INTERIORS



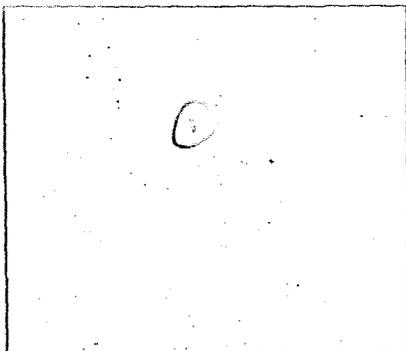
*

A-1F



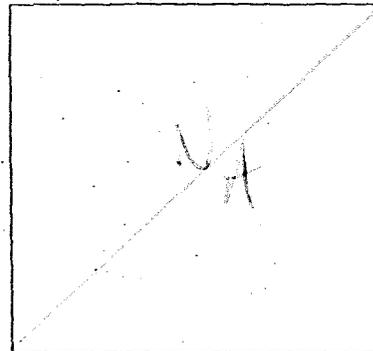
*

A-2F



*

A-2W



* Designates corner closest to A-1 point of reference

6 of 13

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

3-45B

467

Final Survey NE Electra Scan & Investigation Survey Map

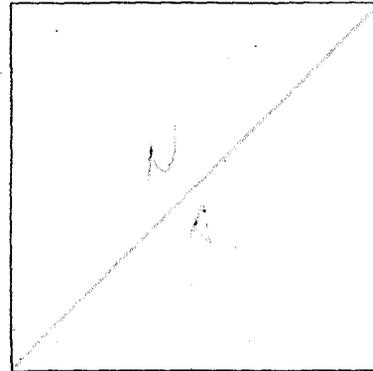
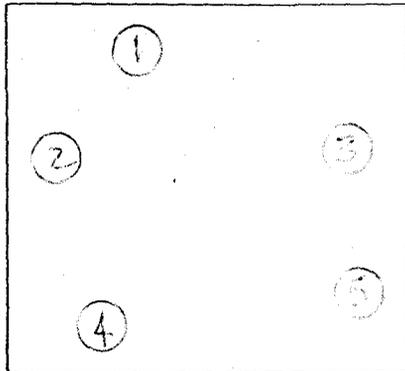
Survey Area: <u>N/A</u>	Survey Unit: <u>INTERIOR/EXTERIOR</u>	Building: <u>7927</u>
Survey Unit Description: <u>A.C. Crawl</u>		
RCT Initials/Date: <u>RF 3/10/00</u>	RCT Initials/Date: <u>JH</u>	RCT Initials/Date: <u>NH</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

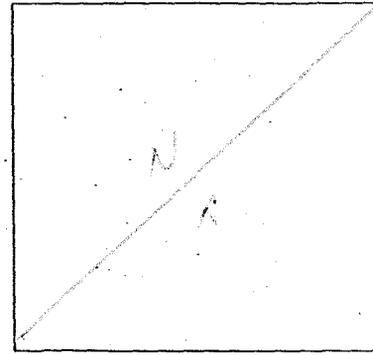
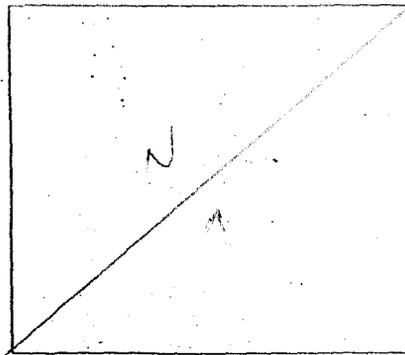
**Legend: "R" - Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**

EXTERIOR

A-Z E



*



* Designates corner closest to A-1 point of reference

7 of 13

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

468

3-459

Final Survey NE Electra Scan & Investigation Survey Form

Survey Area: N/A		Survey Unit: INT. / EXT.			Building: 987				
Survey Unit Description: BLDG 987 INTERIOR - EXTERIOR SCANS									
Loc. ID #	Electra DP-6 Beta				Electra DP-6 Alpha				
	RCT ID #	Inst. ID #	Elevated Audible observed? "Y" or "N"	60-sec PAT (dpm/100cm ²)	RCT ID #	Inst. ID #	4-sec Audible observed? "Y" or "N"	30-sec Static (gcpm)	90-sec PAT (dpm/100cm ²)
EXT		1012							
A2W1		10	N			10	Y	14	
A2W2		10	N			10	Y	20	
A2W3		10	N			10	Y	8	
A2W4		10	N			10	Y	14	
A2W5		10	N			10	Y	12	
A2W6		10	N			10	Y	10	
A2W7		10	N			10	Y	18	
A2N1		10	N			10	Y	22	
A2N2		10	N			10	Y	16	
A2N3		10	N			10	Y	20	
A2N4		10	N			10	Y	10	N/A
A2N5		10	N			10	Y	20	N/A
A2N6		10	N			10	Y	10	
A2N7		10	N			10	Y	10	
A2N8		10	N			10	Y	20	
A2N9		10	N			10	Y	18	
A2N10		10	N			10	Y	14	
A2N11		10	N			10	Y	10	
A2N12		10	N			10	Y	26	
A2N13		10	N			10	Y	14	
A2E1		11	N			11	Y	18	
A2E2		11	N			11	Y	4	
A2E3		11	N			11	Y	8	
A2E4		11	N			11	Y	14	
A2E5		11	N			11	Y	14	

469

Q 2 13 3-460

Survey Area: NIA Survey Unit: INT./EXT. Building: 987
 Survey Unit Description
 ROOF, WALLS, CEILING, + FLOORS OF BUILDING- 987

Total Surface Activity Data Sheet

Sample location	RCT ID #	Inst ID #		Survey count time (sec)		LAB (cpm)		Gross Count (gcpm)		Net counts (cpm)		Net Activity (dpm/100cm2)	
		α	β	α	β	α	β	α	β	α	β	α	β
EXT				90	90								
A-2W		7	7	90	90	4	459	11.3	601	7.3	142	32.7	462
B-2W		7	7	90	90	1.3	456	8	331	6.7	-125	30.0	-412
A-1W		7	7	90	90	3.3	473	5.3	582	2.0	109	8.9	359
A-2W		7	7	90	90	5.3	479	7.3	591	2.0	112	8.9	30.9
B-1W		7	7	90	90	2	457	10	613	8.0	156	35.8	514
A-2S		8	8	90	90	6.7	377	9.3	375	2.6	-2	12.4	416 -7
B-3S		8	8	90	90	11.3	365	8	561	-3.3	196	-15.7	11338 657
A-2E		8	8	90	90	8	387	12	549	4.0	162	16.0	14397 543
B-1E		8	8	90	90	4	416	6	557	2.0	143	9.5	13294 479
A-1R		9	9	90	90	2	432	20.7	577	18.7	145	41.4	455
A-2R		9	9	90	90	1.3	422	18.7	563	17.4	141	85.0	475
INTER				90	90								
B-2W		11	11	90	90	2.7	576	6	704	3.3	134	16.1	451
A-1W		11	11	90	90	4	557	8	792	4.0	205	19.6	684
B-1W		11	11	90	90	2	565	4.7	831	2.7	262	13.2	882
A-3S		11	11	90	90	0.7	603	4.7	641	4.0	30	19.6	128
A-2E		11	11	90	90	3.3	542	8.7	738	5.4	196	26.4	660
B-1E		11	11	90	90	1.3	634	6	827	4.7	143	23.0	650
B-2E		11	11	90	90	3.3	576	4.7	761	3.4	125	16.6	421
B-3E		11	11	90	90	2.7	603	5.3	676	2.6	61	12.7	205
A-1F		11	11	90	90	0.7	578	7.3	839	6.6	261	32.3	878
A-2F		11	11	90	90	2	533	4	583	2.0	254	9.8	855
B-2F		11	11	90	90	2.7	557	5.3	803	2.6	252	12.7	548
C-1F		11	11	90	90	3.3	557	8	891	5.3	302	25.4	1017
C-2F		10	10	90	90	3.3	600	6	792	0.7	102	3.4	363 356
A-1C		10	10	90	90	0.7	496	4.7	431	-2.0	-59	1048 306	
A-2C		10	10	90	90	4	1192	3.3	450	-0.7	-34	-5.4	1249 419
A-2WQC		12	12	90	90	4.7	555	13.3	536	8.6	181	38.5	112336 632
B-2WQC		12	12	90	90	2	416	3.3	361	1.3	-49	5.8	-526
A-2WQC		12	12	90	90	2.7	475	13.3	542	10.6	67	47.4	221
A-2EQC		12	12	90	90	2	425	9.3	550	7.3	125	32.7	412
B-1EQC		12	12	90	90	3.3	433	6	532	2.7	103	12.1	339

Note: Measurements are to be collected by a different technician than the original survey. Mark the QC location number in the "Sample Location" column. Material background is assumed to be zero unless otherwise noted. "LAB" ~ local area background.

472

3-463

Survey Area: NA	Survey Unit: Exterior	Building: 987
Survey Unit Description Walls, Floor, Ceiling & Corners of Room 987		

Removable Contamination Data Sheet

Sample Location	RCT ID #	Inst ID #		Gross Counts (gcpm)		Net Counts (cpm)		Removable Activity (dpm/100cm ²)	
		α	β	α	β	α	β	α	β
EXTERIOR									
A-2N		1	4	0.5	34.5	-0.4	-4.3	-1.2	-17.2
B-2N		2	5	0.5	39	0	-2.9	0	-11.6
A-1W		3	6	0	39	-0.7	-0.9	-2.1	-3.6
A-2W		1	4	0.5	41	-0.4	2.2	-1.2	5.8
B-1W		2	5	0.5	35	0	-0.9	0	-2.6
A-2S		3	6	1.0	31	0.3	-8.4	0.5	-35.6
B-3S		1	4	0.5	33	-0.4	-5.8	-1.2	-23.2
A-2E		2	5	1.0	36	0.5	-8.4	1.5	-23.6
B-1E		3	6	0.0	43.5	-0.7	3.6	-2.1	14.4
A-1R		1	4	0.5	47.5	-0.4	8.7	-1.2	34.8
A-2R		2	5	0.5	33.5	0	-0.4	0	-2.6
INTERIOR									
B-2N		13	15	0	47	-0.5	7	-1.5	28
A-1W		14	16	0.5	39.5	0.1	-0.8	0.3	-3.2
B-1W		13	15	0	42.5	-0.5	2.5	-1.5	10
A-3S		14	16	1	36	0.6	-10.3	1.8	-41.2
A-2E		13	15	1	39.5	0.5	-0.5	1.5	-2
B-1E		14	16	0	37	-0.4	-3.3	-1.2	-13.2
B-2E		13	15	0.5	30.5	0	-3.5	0	-14
B-3E		14	16	0	35	-0.4	-1.3	-1.2	-5.2
A-1F		13	15	0	31	-0.5	-6	-1.5	-24
A-2F		14	16	1.5	39.5	1.1	-0.8	3.3	-3.2
B-2F		13	15	1	42	0.5	2	1.5	8
C-1F		14	16	1	44	0.6	3.9	1.5	14.8
C-2F		13	15	1	52.5	0.5	12.5	1.5	50
A-1C		14	16	0	47	-0.4	6.7	-1.2	26.6
A-2C		13	15	0.5	41	0	1	0	4
B-1C		14	16	0	39.5	-0.4	-0.8	-1.2	-3.2
C-2C		13	15	2	53	1.5	13	4.5	52

474

3-465

Survey Area: <i>N/A</i>	Survey Unit: <i>EXTRACELL</i>	Building: <i>987</i>
Survey Unit Description: <i>GROUND ROSS INVESTIGATION OF 987 BLDG</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>JACQUE PACKER</i>	[REDACTED]	<i>[Signature]</i>	<i>3-11-00</i>
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<i>Ron Worstey</i>	[REDACTED]	<i>[Signature]</i>	<i>3-13-00</i>
RCT Foreman Printed Name		RCT Foreman Signature	Date

475

Survey Area: <u>N/A</u>	Survey Unit: <u>EXTERIOR</u>	Building: <u>987</u>
Survey Unit Description: <u>POINT ROOF INVESTIGATION OF B987</u>		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer						
Model						
Inst. ID #	1	2	3	4	5	6
Serial #						
Cal. Due Date				<u>N/A</u>		
Analysis Date				<u>A</u>		
Instrument Bkg ^{cpm} 10-min count time						
Instrument Eff (%)						
Instrument MDA 2-min count time ^{dpm}						

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.				
Model	Electra		Electra		Electra				
Inst. ID #	7		8		9		10	11	12
Serial # / Probe #	<u>2376 1921</u>								
Cal. Due Date	<u>8-23-00</u>						<u>N/A</u>		
Survey Date	<u>3-11-00</u>						<u>A</u>		
Alpha Bkg 90-sec ^{cpm} count time	<u>2</u>		<u>463</u>						
Beta Bkg 90-sec ^{cpm} count time									
Alpha Eff (%)	<u>20.46</u>		<u>29.7</u>						
Beta Eff (%)									
Alpha MDA 90-sec ^{dpm} count time	<u>35.1</u>		<u>281</u>						
Beta MDA 90-sec ^{dpm} count time									

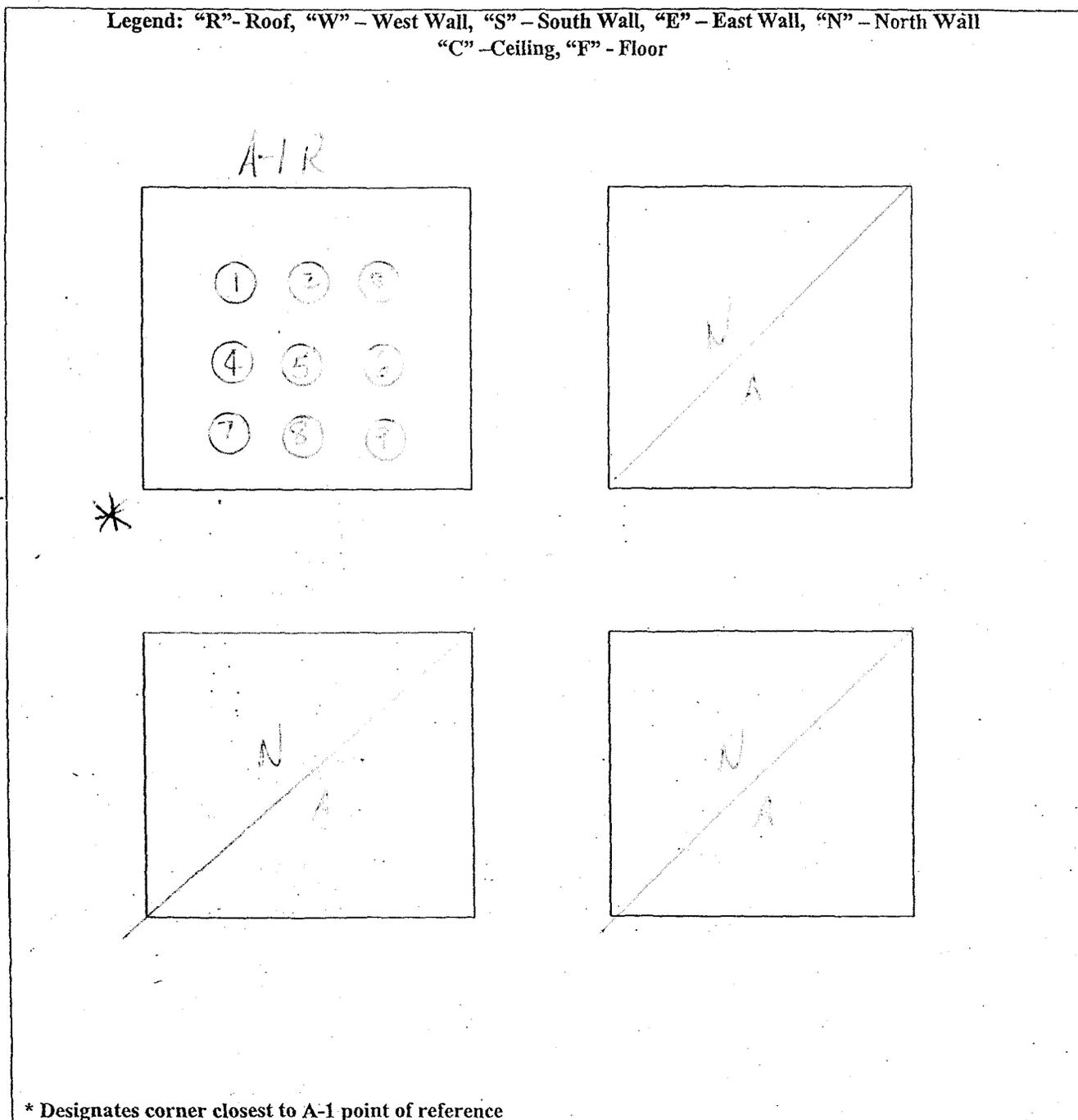
476

Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>EX-8102</u>	Building: <u>987</u>
Survey Unit Description: <u>A-POINT INVESTIGATION</u>		
RCT Initials/Date: <u>RP 3/1/00</u>	RCT Initials/Date: <u>slt</u>	RCT Initials/Date: <u>slt</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" - Ceiling, "F" - Floor**



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

477

2468 2 00 d

Survey Area: <i>N/A</i>	Survey Unit: <i>...</i>	Building: <i>...</i>
Survey Unit Description <i>...</i>		

SURVEY SIGNATURE SHEET

Removable /Total Surface Activity Performed By

<i>[Redacted]</i>	<i>[Redacted]</i>	<i>[Redacted]</i>	<i>5-31-00</i>
RCT Printed Name		RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Quality Control Measurements Performed By

RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date
RCT Printed Name	Employee #	RCT Signature	Date

Survey Reviewed By

<i>Rob Washin</i>	<i>[Redacted]</i>	<i>[Redacted]</i>
RCT Foreman Printed Name	RCT Foreman Signature	Date

479

Survey Area: N/A	Survey Unit: EXTERIOR	Building: 987
Survey Unit Description EXTERIOR ROOF (INVESTIGATION)		

INSTRUMENT DATA SHEET

Removable Contamination Survey Instrument Data

Manufacturer	EBERLINE	EBERLINE				
Model	SAC-4	BC-4				
Inst. ID #	1	2	3	4	5	6
Serial #	823	966				
Cal. Due Date	9/6/00	9/15/00				
Analysis Date	5/31/00	5/31/00				
Instrument Bkg. <i>cpm</i> 10-min count time	0.3	37.3				
Instrument Eff (%)	33	25				
Instrument MDA <i>dpm</i> 1-min count time	13.9	67.7	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

Total Surface Activity Instrument Data

Manufacturer	N.E. Tech.		N.E. Tech.		N.E. Tech.							
Model	Electra		Electra		Electra							
Inst. ID #	7		8		9		10		11		12	
Serial # / Probe #	2385	1931										
Cal. Due Date	8/23/00											
Survey Date	5/31/00											
Alpha Bkg 90-sec <i>cpm</i> count time	Beta Bkg 90- sec count time <i>cpm</i>		5	492								
Alpha Eff (%)	Beta Eff (%)		20.46	29.7								
Alpha MDA 90-sec <i>dpm</i> count time	Beta MDA 90-sec <i>dpm</i> count time		64.1	357	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

480

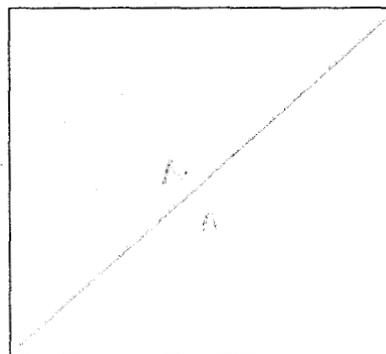
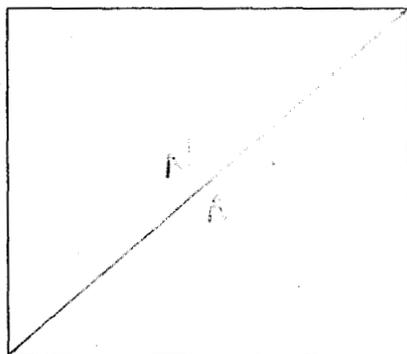
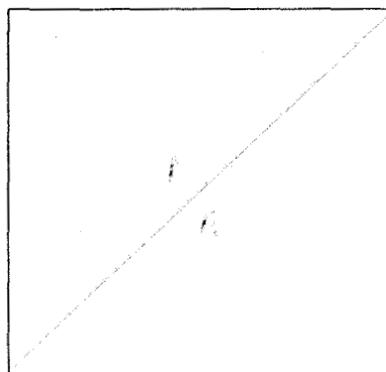
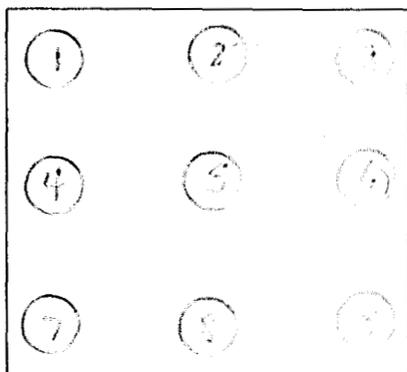
Final Survey NE Electra Scan & Investigation Survey Map

Survey Area: <u>N/A</u>	Survey Unit: <u>CEILING</u>	Building: <u>981</u>
Survey Unit Description: <u>BLDG. 981 EXTERIOR ROOF (INVESTIGATION)</u>		
RCT Initials/Date: <u>228 5/20/00</u>	RCT Initials/Date: <u>228</u>	RCT Initials/Date: <u>228</u>

Refer to the Final Survey NE Electra Scan & Investigation Survey Form for instrumentation, surveyor & approval information.

**Legend: "R"- Roof, "W" - West Wall, "S" - South Wall, "E" - East Wall, "N" - North Wall
"C" -Ceiling, "F" - Floor**

A 2 R



* Designates corner closest to A-1 point of reference

Results/Comments:

Electra alpha scans were performed at the locations detailed on the survey map(s). All required accessible areas were scanned. All initial scan results were <225 dpm/100cm², unless noted on the survey form.

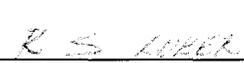
Electra beta scans were performed in required accessible areas. Initial scan results indicated no detectable activity above background unless noted on the survey form.

483

**4.0 CHARACTERIZATION INSTRUCTION FOR
NON-RADIOLOGICAL INSPECTION AND
SAMPLING**

Survey Area: N/A	Survey Unit: N/A	Building: T-771D
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

T-771D Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol</i> , MAN-077-DDCP.			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

Survey Area: N/A	Survey Unit: N/A	Building: T-771D
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light ballast for leaking PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

486

T771D

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Trailer 771D.

General Facility Location: Northwest Buffer Zone; east of current landfill.

INSPECTION RESULTS

Trailer 771D contains wood ceiling panels and fiberglass wall insulation. No other suspect asbestos containing materials were identified and no samples were collected.

SAMPLE RESULTS

None required; none taken.

Andre Gonzalez

INSPECTOR'S NAME

[Handwritten Signature]

SIGNATURE

7/12/00

DATE

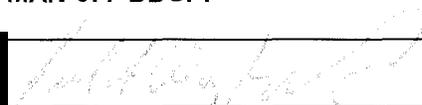
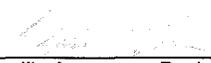
192/212

44

487

Survey Area: N/A	Survey Unit: N/A	Building: T-331
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

T-331 Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP</i> .			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

488

Survey Area: N/A	Survey Unit: N/A	Building: T-331
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

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T331

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Trailer 331.

General Facility Location: North Buffer Zone by the current firing range.

INSPECTION RESULTS

No suspect asbestos containing materials were identified in Trailer 331 and no samples were collected. Fiberglass insulation was found throughout the walls.

SAMPLE RESULTS

None required; none taken.

Andre Gonzalez

INSPECTOR'S NAME

[Signature]

SIGNATURE

7/12/00

DATE

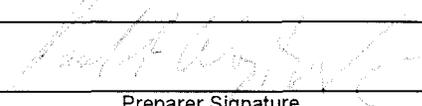
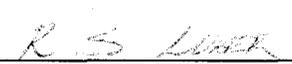
195/212

4-7

490

Survey Area: N/A	Survey Unit: N/A	Building: T-750E
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

T-750E Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol</i> , MAN-077-DDCP.			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

Survey Area: N/A	Survey Unit: N/A	Building: T-750E
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

T750E

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Trailer 750E.

General Facility Location: North Buffer Zone; South of new firing range.

INSPECTION RESULTS

Trailer 750E contains ceiling tile, floor linoleum and drywall with no tape joint compound. Fiberglass insulation was found throughout the walls. The following table summarizes the results of the samples collected and the percent and type of asbestos detected:

SAMPLE RESULTS

Sample Number	Material Sampled & Location	Analytical Results
T750E-03012000-05-011	Brown sheet linoleum	20% Chrysotile in paper backing
T750E-03012000-05-012	Brown sheet linoleum	20% Chrysotile in paper backing
T750E-03012000-05-013	2' x 4' white ceiling tile	None Detected
T750E-03012000-05-014	2' x 4' white ceiling tile	None Detected
T750E-03012000-05-015	Drywall (no tape joint compound)	None Detected
T750E-03012000-05-016	Drywall (no tape joint compound)	None Detected
T750E-03012000-05-017	Drywall (no tape joint compound)	None Detected

Andre Gonzalez

INSPECTOR'S NAME

[Signature]

SIGNATURE

7/12/00

DATE

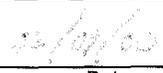
198/212

4-10

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Survey Area: N/A	Survey Unit: N/A	Building: T-903A
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

T-903A Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol</i> , MAN-077-DDCP.			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

Survey Area: N/A	Survey Unit: N/A	Building: T-903A
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

T903A

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Trailer 903A.

General Facility Location: North Buffer Zone; South of existing firing range.

INSPECTION RESULTS

Trailer 903A contains two different types of floor tile. Fiberglass insulation was found throughout the walls. The following table summarizes the results of the samples collected and the percent and type of asbestos detected:

SAMPLE RESULTS

Sample Number	Material Sampled & Location	Analytical Results
T903A-03012000-05-007	12" X 12" White floor tile with tan mastic	None Detected
T903A-03012000-05-008	12" x 12" White floor tile with tan mastic	None Detected
T903A-03012000-05-009	Green sheet tile with brown mastic	None Detected
T903A-03012000-05-010	Green sheet tile with brown mastic	None Detected

Andre Gonzalez

INSPECTOR'S NAME



SIGNATURE

7/12/00

DATE

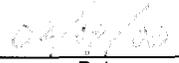
201/212

413

496

Survey Area: N/A	Survey Unit: N/A	Building: T-331A
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

T-331A Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP.</i>			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

497

Survey Area: N/A	Survey Unit: N/A	Building: T-331A
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arian Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

T331A

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Trailer 331A.

General Facility Location: east of and adjacent to Building 331.

INSPECTION RESULTS

Several materials within the trailer posed the potential for containing asbestos, as evidenced by the large number of samples from ceiling panels, drywall, linoleum, and base material beneath the carpet. One occurrence of asbestos was detected in sample -010, representing the entire floor of the trailer; however, the asbestos was not in a friable form. Fiberglass insulation was identified inside the walls.

204/212

4-16

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SAMPLE RESULTS

Sample Number	Material Sampled & Location	Analytical Results
T331A-0308200005-001	Tan/white ceiling tile	None Detected
T331A-0308200005-002	Tan/white ceiling tile	None Detected
T331A-0308200005-003	White/gray wall covering; white/tan drywall	None Detected
T331A-0308200005-004	White/gray wall covering; white/tan drywall	None Detected
T331A-0308200005-005	White/gray wall covering; white/tan drywall	None Detected
T331A-0308200005-006	Gray/white mastic; white plaster; white linoleum	None Detected
T331A-0308200005-007	White linoleum	None Detected
T331A-0308200005-008	White mastic/plaster/linoleum	None Detected
T331A-0308200005-009	Tan mastic; white mastic/plaster/linoleum	None Detected
T331A-0308200005-010	Tan mastic; brown tile	12% Chrysotile; nonfriable
T331A-0309200005-001	Black Tar	None Detected
T331A-0309200005-002	Black Tar	None Detected

Andre Gonzalez

INSPECTOR'S NAME

[Signature]

SIGNATURE

7/12/00

DATE

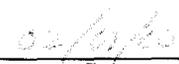
204a/212

4-17

500

Survey Area: N/A	Survey Unit: N/A	Building: B-331A
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

B-331A Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP.</i>			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

501

Survey Area: N/A	Survey Unit: N/A	Building: B-331A
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

502

B331A

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Building 331A.

General Facility Location: north and adjacent to Building 335.

INSPECTION RESULTS

Portions of the walls consist of Transite® (based on visual inspection). Asbestos contained within the Transite is not in friable form, but could become friable if disintegrated.

SAMPLE RESULTS

None required; none taken.

Andre Gonzalez

INSPECTOR'S NAME

[Signature]

SIGNATURE

7/12/00

DATE

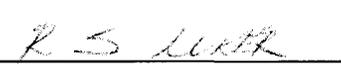
503

207/212

4-20

Survey Area: N/A	Survey Unit: N/A	Building: B-987
Survey Unit Description Characterization Package		

CHARACTERIZATION INSTRUCTION COVER SHEET

B-987 Non-Radiological Concerns: Asbestos, PCB ballasts			
Special Support Requirements Ladder, scaffolding, or man-lift. CDPHE-certified asbestos inspector for inspections and sampling. RCTs to support sampling operations.			
Special Safety Precautions Fall protection is required for work above 6 ft. Respiratory protection at the discretion of IH. Access to roofs, stairs, or elevated structures may require additional approvals from security personnel. Refer to Activity Hazards Analysis and 3-PRO-165-RSP-07.02, "Contamination Monitoring Requirements"			
Labeling Requirements Sample containers must be labelled as described in the applicable Characterization Procedure. Obtain pre-printed, uniquely numbered sample labels from ASD or RLC project representative if applicable.			
Characterization Instruction Implementation This survey package is ready for implementation. Adequate detail is provided to allow implementation by the sampling team. DQO's and data evaluation requirements are covered in the <i>Decontamination and Decommissioning Characterization Protocol, MAN-077-DDCP.</i>			
Paul A. Wojtaszek			
Preparer Printed Name		Preparer Signature	Date
			
Quality Assurance Reviewer Printed Name		Quality Assurance Reviewer Signature	Date

504

Survey Area: N/A	Survey Unit: N/A	Building: B-987
Survey Unit Description Characterization Package		

SAMPLING AND SURVEY INSTRUCTIONS

Minimum Survey & Sample Measurement Requirements		
Measurement	Amount & Type	Comments
Media samples for asbestos analysis	At discretion of asbestos inspector. SEE NOTES 1 AND 2.	Sampler SHALL be a CDPHE Certified Asbestos Inspector ; Sampling SHALL be performed according to PRO-563-ACPR, <i>Asbestos Characterization Procedure</i> ; Inspection will determine precise sampling locations based upon accessibility. Sampler SHALL provide a map or sketch of precise sample locations and media (i.e., show pipes, ducts, etc)
Inspection of fluorescent light fixtures for PCB ballasts	All fluorescent light fixtures.	All PCB ballasts must be removed prior to disposition by certified individuals.

NOTE 1: In order that sampling locations may be unequivocally located after sample analysis, sampling locations **SHALL** be documented on sample maps as well as the appropriate logs as required by the applicable characterization procedure, **AND** the sample location **SHALL** be physically marked either with a sticker or other durable marking containing the RIN, event, and bottle numbers (or if an IH sample, the IH sample number) of the sample.

NOTE 2: A Property / Waste Release Evaluation (PWRE) is required for all analytical samples to be transported offsite for analysis. However, the instructions for RCTs and Radiological Operations Foreman in the following sections may be waived if it is deemed by Radiological Engineering (Arlan Moore) that no assay is required due to building history and process knowledge, per 3-PRO-141-RSP 09.01, *Unrestricted Release of Property, Material, Equipment, and Waste.*

B987

ASBESTOS INSPECTOR'S REPORT

I, the undersigned Certified Asbestos Inspector, certification # [REDACTED] in the state of Colorado, attest to the asbestos inspection and sampling results as described below, for the following facility (at RFETS): Building 987.

General Facility Location: due west of Building 991, outside of protected area.

INSPECTION RESULTS

The roof consists of Transite®, based on visual inspection, and could become friable if disintegrated; the remainder of the building consists of cinder block construction.

SAMPLE RESULTS

None required; none taken.

Andre Conder

INSPECTOR'S NAME

[Handwritten Signature]

SIGNATURE

7/12/00

DATE

506

210/212
4-23

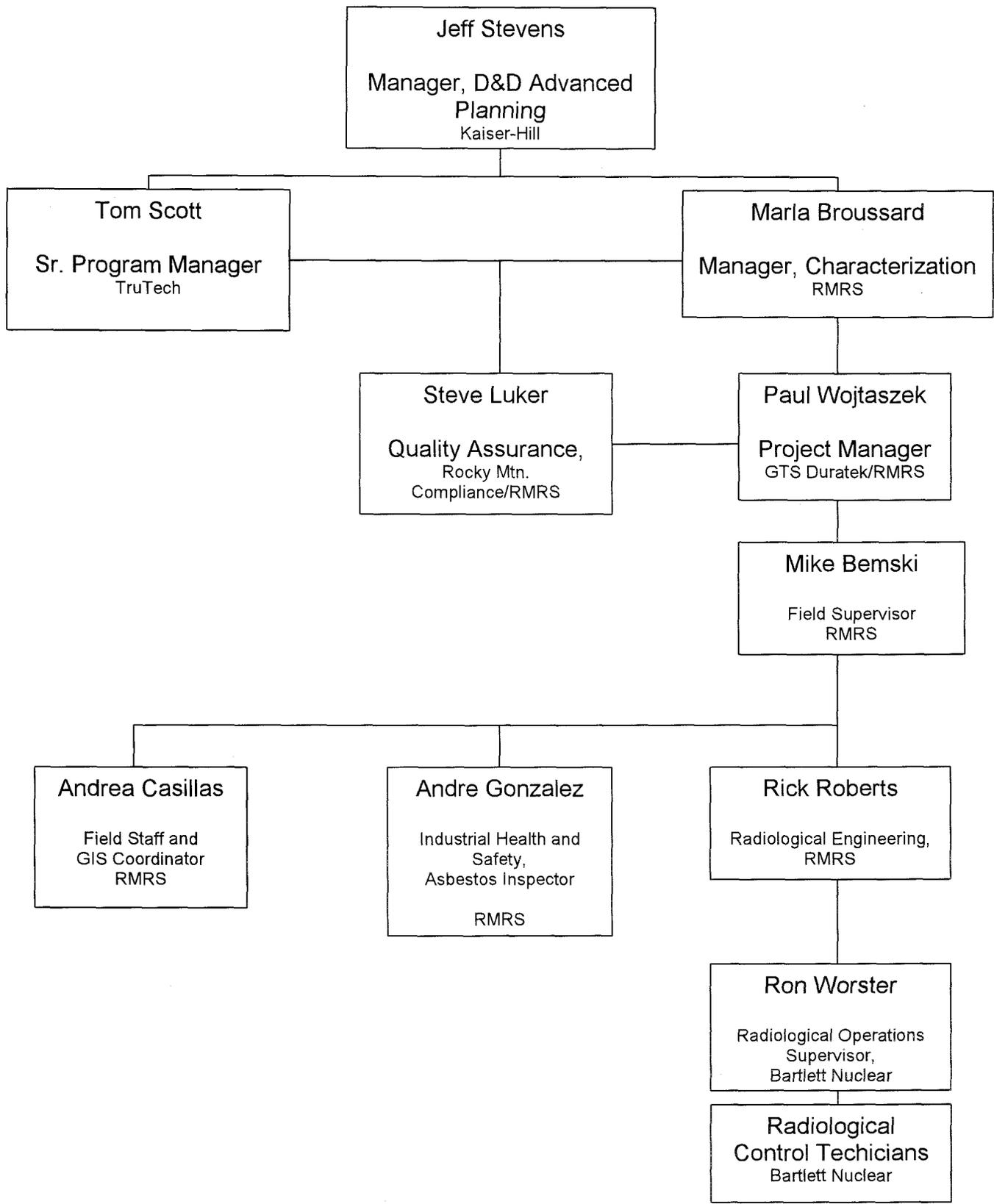
5.0 ORGANIZATIONAL CHART

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Rev 0

5-1

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Organizational Chart

Characterization of facilities T-771D, T-750E, T-331, T-331A, B-331A, B-987, and T-903A .

212 of 212

5-2

*Paul Wojtaszek
Project Manager
GTS Duratek/RMRS*

508

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +20%	Bias	Survey Type
B331A I/E	SAC-4	961	N/A	6/21/00	3/8/00	Y	Y	Y	Y	RA-Alpha
B331A I/E	BC-4	961	N/A	6/27/00	3/8/00	Y	Y	Y	Y	RA-Beta
B331A I/E	SAC-4	1170	N/A	6/30/00	3/9/00	Y	Y	Y	Y	RA-Alpha
B331A I/E	SAC-4	1171	N/A	7/11/00	3/9/00	Y	Y	Y	N	RA-Alpha
B331A I/E	BC-4	928	N/A	3/27/00	3/9/00	Y	Y	Y	N	RA-Beta
B331A I/E	BC-4	868	N/A	7/12/00	3/9/00	Y	Y	Y	N	RA-Beta
B331A I/E	SAC-4	823	N/A	9/6/00	5/24/00	Y	Y	Y	Y	RA-Alpha
B331A I/E	BC-4	966	N/A	9/15/00	5/24/00	Y	Y	Y	Y	RA-Beta
B331A I/E	NE Electra	2378	1956	5/3/00	3/4/00	Y	Y	Y	Y	TSA
B331A I/E	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
B331A I/E	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
B331A I/E	NE Electra	2376	1921	8/23/00	3/9/00	Y	Y	Y	Y	TSA QC
B331A I/E	NE Electra	2378	1956	5/3/00	3/9/00	Y	Y	Y	N	SS TSA
B331A I/E	NE Electra	1395	1368	7/19/00	3/10/00	Y	Y	Y	Y	SS
B331A I/E	NE Electra	2376	1921	8/23/00	3/10/00	Y	Y	Y	Y	SS
B331A I/E	NE Electra	2378	1956	5/3/00	3/10/00	Y	Y	Y	N	SS QC
B331A I/E	NE Electra	2376	1921	8/23/00	3/11/00	Y	Y	Y	Y	SS
B331A I/E	NE Electra	2385	1931	6/14/00	5/24/00	Y	Y	Y	Y	TSA
T331 Int	SAC-4	1170	N/A	6/30/00	3/10/00	Y	Y	Y	Y	RA-Alpha
T331 Int	SAC-4	1171	N/A	7/11/00	3/10/00	Y	Y	Y	N	RA-Alpha
T331 Int	BC-4	928	N/A	3/27/00	3/10/00	Y	Y	Y	N	RA-Beta
T331 Int	BC-4	868	N/A	7/12/00	3/10/00	Y	Y	Y	N	RA-Beta
T331 Int	NE Electra	1552	1419	5/3/00	3/6/00	Y	Y	Y	N	TSA
T331 Int	NE Electra	2376	1921	8/23/00	3/6/00	Y	Y	Y	Y	TSA
T331 Int	NE Electra	2378	1956	5/3/00	3/10/00	Y	Y	Y	N	SS TSA QC
T331 Int	NE Electra	2376	1921	8/23/00	3/10/00	Y	Y	Y	Y	SS QC
T331 Ext	SAC-4	961	N/A	6/21/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T331 Ext	SAC-4	1171	N/A	7/11/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T331 Ext	BC-4	961	N/A	6/27/00	3/8/00	Y	Y	Y	Y	RA-Beta
T331 Ext	BC-4	868	N/A	7/12/00	3/8/00	Y	Y	Y	N	RA-Beta
T331 Ext	SAC-4	823	N/A	9/9/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T331 Ext	BC-4	966	N/A	9/15/00	3/29/00	Y	Y	Y	Y	RA-Beta
T331 Ext	SAC-4	1171	N/A	7/11/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T331 Ext	BC-4	868	N/A	7/12/00	3/29/00	Y	Y	Y	Y	RA-Beta

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +20%	Bias	Survey Type
T331 Ext	NE Electra	2385	1931	6/14/00	3/4/00	Y	Y	Y	Y	TSA
T331 Ext	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
T331 Ext	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
T331 Ext	NE Electra	2378	1956	5/3/00	3/7/00	Y	Y	Y	Y	SS
T331 Ext	NE Electra	2376	1921	8/23/00	3/7/00	Y	Y	Y	Y	SS SS QC
T331 Ext	NE Electra	2376	1921	8/23/00	3/8/00	Y	Y	Y	Y	TSA QC
T331 Ext	NE Electra	2374	1919	9/8/00	3/28/00	Y	Y	Y	Y	TSA
T331 Ext	NE Electra	2376	1921	8/23/00	3/28/00	Y	Y	Y	Y	TSA
T331A Int	SAC-4	1170	N/A	6/30/00	3/11/00	Y	Y	Y	N	RA-Alpha
T331A Int	SAC-4	961	N/A	6/21/00	3/11/00	Y	Y	Y	Y	RA-Alpha
T331A Int	BC-4	928	N/A	3/27/00	3/11/00	Y	Y	Y	N	RA-Beta
T331A Int	BC-4	961	N/A	6/27/00	3/11/00	Y	Y	Y	Y	RA-Beta
T331A Int	SAC-4	1170	N/A	6/30/00	3/9/00	Y	Y	Y	Y	RA-Alpha
T331A Int	BC-4	928	N/A	3/27/00	3/9/00	Y	Y	Y	N	RA-Beta
T331A Int	SAC-4	1171	N/A	7/11/00	3/9/00	Y	Y	Y	N	RA-Alpha
T331A Int	BC-4	868	N/A	7/12/00	3/9/00	Y	Y	Y	N	RA-Beta
T331A Int	NE Electra	1395	1368	7/19/00	3/11/00	Y	Y	Y	Y	TSA/SS TSA/SS QC
T331A Int	NE Electra	2376	1921	8/23/00	3/11/00	Y	Y	Y	Y	TSA SS
T331A Int	NE Electra	2378	1956	5/3/00	3/8/00	Y	Y	Y	N	TSA
T331A Ext	SAC-4	1170	N/A	6/30/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	SAC-4	1171	N/A	7/11/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	SAC-4	961	N/A	6/21/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	BC-4	928	N/A	3/27/00	3/7/00	Y	Y	Y	N	RA-Beta
T331A Ext	BC-4	868	N/A	7/12/00	3/7/00	Y	Y	Y	N	RA-Beta
T331A Ext	BC-4	961	N/A	6/27/00	3/7/00	Y	Y	Y	Y	RA-Beta
T331A Ext	SAC-4	1170	N/A	6/30/00	3/9/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	BC-4	928	N/A	3/27/00	3/9/00	Y	Y	Y	N	RA-Beta
T331A Ext	SAC-4	1171	N/A	7/11/00	3/9/00	Y	Y	Y	N	RA-Alpha
T331A Ext	BC-4	868	N/A	7/12/00	3/9/00	Y	Y	Y	N	RA-Beta
T331A Ext	SAC-4	823	N/A	9/6/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	BC-4	966	N/A	9/15/00	3/29/00	Y	Y	Y	Y	RA-Beta
T331A Ext	SAC-4	1171	N/A	7/11/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T331A Ext	BC-4	868	N/A	7/12/00	3/29/00	Y	Y	Y	Y	RA-Beta
T331A Ext	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +/-20%	Bias	Survey Type
T331A Ext	NE Electra	2378	1956	5/3/00	3/4/00	Y	Y	Y	Y	TSA
T331A Ext	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
T331A Ext	NE Electra	2385	1931	6/14/00	3/4/00	Y	Y	Y	Y	TSA
T331A Ext	NE Electra	1395	1368	7/19/00	3/9/00	Y	Y	Y	Y	SS
T331A Ext	NE Electra	2378	1956	5/3/00	3/9/00	Y	Y	Y	Y	SS
T331A Ext	NE Electra	2376	1921	8/23/00	3/9/00	Y	Y	Y	Y	SS TSA/SS QC
T331A Ext	NE Electra	2376	1921	8/23/00	3/9/00	Y	Y	Y	Y	TSA (Asbestos)
T331A Ext	NE Electra	2374	1919	9/8/00	3/28/00	Y	Y	Y	Y	TSA
T331A Ext	NE Electra	2376	1921	8/23/00	3/28/00	Y	Y	Y	Y	TSA
T750E Int	SAC-4	961	N/A	6/21/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T750E Int	SAC-4	1171	N/A	7/11/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T750E Int	BC-4	961	N/A	6/27/00	3/8/00	Y	Y	Y	Y	RA-Beta
T750E Int	BC-4	868	N/A	7/12/00	3/8/00	Y	Y	Y	N	RA-Beta
T750E Int	NE Electra	2378	1956	5/3/00	3/6/00	Y	Y	Y	Y	TSA
T750E Int	NE Electra	1395	1368	7/19/00	3/10/00	Y	Y	Y	Y	SS TSA QC
T750E Int	NE Electra	2376	1921	8/23/00	3/10/00	Y	Y	Y	Y	SS
T750E Int	NE Electra	2378	1956	5/3/00	3/10/00	Y	Y	Y	N	SS QC
T750E Ext	SAC-4	961	N/A	6/21/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T750E Ext	BC-4	961	N/A	6/27/00	3/8/00	Y	Y	Y	Y	RA-Beta
T750E Ext	SAC-4	1171	N/A	7/11/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T750E Ext	BC-4	868	N/A	7/12/00	3/8/00	Y	Y	Y	N	RA-Beta
T750E Ext	SAC-4	823	N/A	9/6/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T750E Ext	BC-4	966	N/A	9/15/00	3/29/00	Y	Y	Y	Y	RA-Beta
T750E Ext	SAC-4	1171	N/A	7/11/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T750E Ext	BC-4	868	N/A	7/12/00	3/29/00	Y	Y	Y	Y	RA-Beta
T750E Ext	NE Electra	2385	1931	6/14/00	3/4/00	Y	Y	Y	Y	TSA
T750E Ext	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
T750E Ext	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
T750E Ext	NE Electra	2378	1956	5/3/00	3/7/00	Y	Y	Y	Y	SS
T750E Ext	NE Electra	2376	1921	8/23/00	3/7/00	Y	Y	Y	Y	SS SS QC
T750E Ext	NE Electra	2376	1921	8/23/00	3/8/00	Y	Y	Y	Y	TSA QC
T750E Ext	NE Electra	2374	1919	9/8/00	3/28/00	Y	Y	Y	Y	TSA
T750E Ext	NE Electra	2376	1921	8/23/00	3/28/00	Y	Y	Y	Y	TSA

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +20%	Bias	Survey Type
T771D Int	SAC-4	1170	N/A	6/30/00	3/11/00	Y	Y	Y	N	RA-Alpha
T771D Int	BC-4	928	N/A	3/27/00	3/11/00	Y	Y	Y	N	RA-Beta
T771D Int	SAC-4	1171	N/A	7/11/00	3/11/00	Y	Y	Y	N	RA-Alpha
T771D Int	BC-4	868	N/A	7/12/00	3/11/00	Y	Y	Y	N	RA-Beta
T771D Int	NE Electra	2376	1921	8/23/00	3/11/00	Y	Y	Y	Y	SS/TSA SS/TSA QC
T771D Int	NE Electra	1395	1368	7/19/00	3/11/00	Y	Y	Y	Y	SS/TSA
T771D Int	NE Electra	2378	1956	5/3/00	3/11/00	Y	Y	Y	N	TSA
T771D Ext	SAC-4	961	N/A	6/21/00	3/8/00	Y	Y	Y	Y	RA-Alpha
T771D Ext	BC-4	961	N/A	6/27/00	3/8/00	Y	Y	Y	Y	RA-Beta
T771D Ext	SAC-4	823	N/A	9/6/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T771D Ext	BC-4	966	N/A	9/15/00	3/29/00	Y	Y	Y	Y	RA-Beta
T771D Ext	SAC-4	1171	N/A	7/11/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T771D Ext	BC-4	868	N/A	7/12/00	3/29/00	Y	Y	Y	Y	RA-Beta
T771D Ext	NE Electra	2385	1931	6/14/00	3/4/00	Y	Y	Y	Y	TSA
T771D Ext	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
T771D Ext	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
T771D Ext	NE Electra	2376	1921	8/23/00	3/7/00	Y	Y	Y	Y	SS SS QC
T771D Ext	NE Electra	2378	1956	5/3/00	3/7/00	Y	Y	Y	Y	SS
T771D Ext	NE Electra	1395	1368	7/19/00	3/7/00	Y	Y	Y	Y	SS
T771D Ext	NE Electra	2376	1921	8/23/00	3/8/00	Y	Y	Y	Y	TSA QC
T771D Ext	NE Electra	2374	1919	9/8/00	3/28/00	Y	Y	Y	Y	TSA
T771D Ext	NE Electra	2376	1921	8/23/00	3/28/00	Y	Y	Y	Y	TSA
T903A Int	SAC-4	1170	N/A	6/30/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T903A Int	SAC-4	1171	N/A	7/11/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T903A Int	SAC-4	961	N/A	6/21/00	3/7/00	Y	Y	Y	Y	RA-Alpha
T903A Int	BC-4	928	N/A	3/27/00	3/7/00	Y	Y	Y	N	RA-Beta
T903A Int	BC-4	868	N/A	7/12/00	3/7/00	Y	Y	Y	N	RA-Beta
T903A Int	BC-4	961	N/A	6/27/00	3/7/00	Y	Y	Y	Y	RA-Beta
T903A Int	SAC-4	1170	N/A	6/30/00	3/11/00	Y	Y	Y	N	RA-Alpha
T903A Int	BC-4	928	N/A	3/27/00	3/11/00	Y	Y	Y	N	RA-Beta
T903A Int	NE Electra	1552	1419	5/3/00	3/6/00	Y	Y	Y	N	SS/TSA
T903A Int	NE Electra	2376	1921	8/23/00	3/6/00	Y	Y	Y	Y	SS
T903A Int	NE Electra	1395	1368	7/19/00	3/7/00	Y	Y	Y	Y	SS/TSA QC
T903A Int	NE Electra	1395	1368	7/19/00	3/11/00	Y	Y	Y	Y	TSA

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +/-20%	Bias	Survey Type
T903A Ext	SAC-4	1170	N/A	6/30/00	3/4/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	SAC-4	1171	N/A	7/11/00	3/4/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	SAC-4	961	N/A	6/21/00	3/4/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	BC-4	928	N/A	3/27/00	3/4/00	Y	Y	Y	N	RA-Beta
T903A Ext	BC-4	868	N/A	7/12/00	3/4/00	Y	Y	Y	N	RA-Beta
T903A Ext	BC-4	961	N/A	6/27/00	3/4/00	Y	Y	Y	Y	RA-Beta
T903A Ext	SAC-4	823	N/A	9/6/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	BC-4	966	N/A	9/15/00	3/29/00	Y	Y	Y	Y	RA-Beta
T903A Ext	SAC-4	1171	N/A	7/11/00	3/29/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	BC-4	868	N/A	7/12/00	3/29/00	Y	Y	Y	Y	RA-Beta
T903A Ext	SAC-4	823	N/A	9/6/00	5/24/00	Y	Y	Y	Y	RA-Alpha
T903A Ext	BC-4	966	N/A	9/15/00	5/24/00	Y	Y	Y	Y	RA-Beta
T903A Ext	NE Electra	2385	1931	6/14/00	3/4/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	2378	1956	5/3/00	3/4/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	2378	1956	5/3/00	3/7/00	Y	Y	Y	Y	SS
T903A Ext	NE Electra	1395	1368	7/19/00	3/7/00	Y	Y	Y	Y	SS
T903A Ext	NE Electra	2376	1921	8/23/00	3/7/00	Y	Y	Y	Y	SS QC
T903A Ext	NE Electra	2376	1921	8/23/00	3/8/00	Y	Y	Y	Y	TSA QC
T903A Ext	NE Electra	1395	1368	7/19/00	3/10/00	Y	Y	Y	Y	SS
T903A Ext	NE Electra	2374	1919	9/8/00	3/28/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	2376	1921	8/23/00	3/28/00	Y	Y	Y	Y	TSA
T903A Ext	NE Electra	2385	1931	6/14/00	5/24/00	Y	Y	Y	Y	TSA
B987 I/E	SAC-4	1171	N/A	7/11/00	3/4/00	Y	Y	Y	Y	RA-Alpha
B987 I/E	SAC-4	1170	N/A	6/30/00	3/4/00	Y	Y	Y	Y	RA-Alpha
B987 I/E	SAC-4	961	N/A	6/21/00	3/4/00	Y	Y	Y	Y	RA-Alpha
B987 I/E	BC-4	868	N/A	7/12/00	3/4/00	Y	Y	Y	N	RA-Beta
B987 I/E	BC-4	928	N/A	3/27/00	3/4/00	Y	Y	Y	N	RA-Beta
B987 I/E	BC-4	961	N/A	6/27/00	3/4/00	Y	Y	Y	Y	RA-Beta
B987 I/E	SAC-4	1170	N/A	6/30/00	3/10/00	Y	Y	Y	N	RA-Alpha
B987 I/E	SAC-4	1171	N/A	7/11/00	3/10/00	Y	Y	Y	N	RA-Alpha
B987 I/E	BC-4	928	N/A	3/27/00	3/10/00	Y	Y	Y	N	RA-Beta
B987 I/E	BC-4	868	N/A	7/12/00	3/10/00	Y	Y	Y	N	RA-Beta
B987 I/E	SAC-4	823	N/A	9/6/00	5/31/00	Y	Y	Y	Y	RA-Alpha

Instrument Accuracy/Bias Verification

Location	Model	Inst #	Probe #	Cal Date	Survey Date	Pre	Post	Within +-20%	Bias	Survey Type
B987 I/E	BC-4	966	N/A	9/15/00	5/31/00	Y	Y	Y	Y	RA-Beta
B987 I/E	NE Electra	2378	1956	5/3/00	3/4/00	Y	Y	Y	Y	TSA
B987 I/E	NE Electra	1395	1368	7/19/00	3/4/00	Y	Y	Y	Y	TSA
B987 I/E	NE Electra	2376	1921	8/23/00	3/4/00	Y	Y	Y	Y	TSA
B987 I/E	NE Electra	1395	1368	7/19/00	3/10/00	Y	Y	Y	Y	SS/TSA
B987 I/E	NE Electra	2376	1921	8/23/00	3/10/00	Y	Y	Y	Y	SSTSA
B987 I/E	NE Electra	2378	1956	5/3/00	3/10/00	Y	Y	Y	N	SS/TSA QC
B987 I/E	NE Electra	2376	1921	8/23/00	3/11/00	Y	Y	Y	Y	SS
B987 I/E	NE Electra	2385	1931	6/14/00	5/24/00	Y	Y	Y	Y	TSA

RFETS

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A1148#001

Page 1 of 2

Telephone No. 8165 / 4605 MSIN RAX

Purchase Order/Charge Code NG2200C

Ice Chest No. NA Temp. NA

Bill of Lading/Air Bill No. NA

PRE

SCREENING REQUIRED

SPECIAL INSTRUCTIONS Hold Time Total Activity Exemption: Yes No

(TRAILERS AROUND THE PLANT SITE)
(METAL DISKS)

Bottle No.	Customer Number	Matrix	Date	Time	Location	Container (Size/type/quantity)	Sample Analysis	Preservative: Pickling
00A1148-003.001	7-4R/QC	SOLID	3/28/00	0820	T881A ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-006.001	M-1R/QC	SOLID	3/27/00	1447	T881B ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-009.001	F-20R/QC	SOLID	3/28/00	0850	T888A ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-012.001	F-20R/QC	SOLID	3/28/00	0908	T883B ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-015.001	A-7R/QC	SOLID	3/28/00	0932	T883C ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-018.001	S-1R/QC	SOLID	3/27/00	1415	T439D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-021.001	A-2R/QC	SOLID	3/28/00	1213	T771D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None

Relinquished By: [Signature] Date/Time: 4/4/00 1445

Received By: [Signature] Date/Time: 4/25/00 0815

Relinquished By: [Signature] Date/Time: 4/5/00 1324

Received By: [Signature] Date/Time: 4/27/00 0815

Relinquished By: [Signature] Date/Time: [Blank]

Received By: [Signature] Date/Time: [Blank]

Relinquished By: [Signature] Date/Time: [Blank]

Received By: [Signature] Date/Time: [Blank]

Relinquished By: [Signature] Date/Time: [Blank]

Received By: [Signature] Date/Time: [Blank]

Disposed By: [Signature]

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., returned to customer, disposed of per lab procedure, used in analytical process)

APR 4 2000

619

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

RMRS

RFETS

Telephone No. / #05-
 8165
 FAX
 Purchase Order/Charge Code
 N0220001
 Ice Chest No. N/A
 Temp. N/A
 Bill of Lading/Air Bill No.
 PRE 000515-001

Contract/Requester
 SZYDLOWSKI, TOM / Mike Demos
 Sampling Location
 83 C FACILITY
 Leadbook No.
 Method of Shipment
 Related COC (if any)
 COA INGS #001

SCREENING
 REQUIRED
 SPECIAL INSTRUCTIONS
 Hold Time Total Activity Exemption: Yes No
 The matrix investigation does not need to be performed on these samples. They are the same matrix as RUN#00A1057.

Sample No.	Customer Number	Matrix	Date	Time	Location	Container (size/units/quantity)	Sample Analysis	Preservative / Packing
00A1148-015.002	A-7R/QC	SOLID	3/28/00	0932	T883C	1-SAMPLE / P	TR01A187 (Po-210, Pu, Am, U) [21dS]	None
00A1148-019.002	O-1R	SOLID	3/28/00	1248	T771D	1-SAMPLE / P	TR01A187 (Po-210, Pu, Am, U) [21dS]	None
00A1148-031.002	O-1R	SOLID	3/28/00	1325	T803A	1-SAMPLE / P	TR01A187 (Po-210, Pu, Am, U) [21dS]	None
00A1148-034.002	A-18R	SOLID	3/28/00	1510	T881A	1-SAMPLE / P	TR01A187 (Po-210, Pu, Am, U) [21dS]	None

Requisitioned By: [Signature] Date/Time: 5/15/00
 Relinquished By: [Signature] Date/Time: 5/15/00

Requisitioned By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Disposed By:	Date/Time
[Signature]	5/15/00 1320	[Signature]	5-15-00 1320	[Signature]		[Signature]	
[Signature]		[Signature]		[Signature]		[Signature]	
[Signature]		[Signature]		[Signature]		[Signature]	
[Signature]		[Signature]		[Signature]		[Signature]	

DISPOSAL METHOD (e.g., returned to customer, disposed of per lab procedure, used in analytical process)
 Disposed By: _____ Date/Time: _____

7-3

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

C.O.C. # 00A1148#003

Page 2 of 4

Telephone No. 8165

MSIN FAX

Contact/Requestor SZYDLOWSKI, TOM

RMRS 00A1148

Bottle No.	Customer Number	Matrix	Date	Time	Location	Container (size/type/quantity)	Sample Analysis	Preservative / Packaging
00A1148-011.001	F-20R	SOLID	3/29/00	0905	T883B ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-013.001	H-11R	SOLID	3/29/00	0942	T883CV	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-014.001	A-7R	SOLID	3/29/00	0930	T883CV	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-016.001	F-7R	SOLID	3/29/00	1423	T439D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-017.001	S-1R	SOLID	3/29/00	1400	T439D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-019.001	O-1R	SOLID	3/29/00	1248	T771D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-020.001	A-2R	SOLID	3/29/00	1240	T771D ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-022.001	H-1R	SOLID	3/29/00	1430	T331 ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-023.001	C-1R	SOLID	3/29/00	1420	T331 ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-025.001	H-2R	SOLID	3/29/00	1415	T750E ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None
00A1148-026.001	E-3R	SOLID	3/29/00	1405	T750E ✓	1-SAMPLE / P/G #1	PA04A017 (Alpha Spec Qualitative) [Routine]	None

Relinquished By:	Date/Time	Received By:	Date/Time	Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	4.13.00 1500	<i>[Signature]</i>	4.13.00 15:10	<i>[Signature]</i>	5.11.00 1510	<i>[Signature]</i>	
<i>[Signature]</i>	5.11.00 1500	<i>[Signature]</i>	5.11.00 1500	<i>[Signature]</i>	5.11.00 1510	<i>[Signature]</i>	
<i>[Signature]</i>		<i>[Signature]</i>		<i>[Signature]</i>		<i>[Signature]</i>	
<i>[Signature]</i>		<i>[Signature]</i>		<i>[Signature]</i>		<i>[Signature]</i>	

FINAL SAMPLE DISPOSITION

Disposal Method (e.g., returned to customer, disposed of per lab procedure, used in analytical process)

Disposed By: _____ Date/Time: _____

OASIS Direct Analysis Measurement Result Information

The samples listed below were analyzed using the Oxford Alpha Spectroscopy Integrated System (OASIS) at the Rocky Flats Environmental Technology Site. These samples were counted directly in the alpha spectrometer chambers, without chemical preparation. The technical basis for this type of analysis has been established in TBD-00143, Direct Analysis of Alpha Emitters Using the Oxford Alpha Spectroscopy Integrated System (OASIS), and TBD-00153, Use of the OASIS for Direct Differentiation between Po-210 and DOE-enhanced Materials.

In order to maintain the quality of OASIS measurements, the instrument is performance tested in accordance with Operations Order OO-771-228, Direct Analysis of Alpha Emitters Using the Oxford Alpha Spectroscopy Integrated System (OASIS). This Operations Order establishes the periodicity of performance test and background measurements, and the criteria against which these measurements are judged. All samples are counted by RCTs or REs qualified per JPM 036-119-53, Direct Analysis of Alpha Emitters Using the Oxford Alpha Spectroscopy Integrated System (OASIS) and approved by qualified REs.

A sample of the calibration and performance test data is attached for your review. All such data are maintained by the OASIS analysts and are available for your perusal.

The samples were 1-in coupons with an area of 4.82 cm². Calculation of the activity per 100 cm² was performed assuming that samples were representative. Errors are quoted at one standard deviation, accounting for all associated analytical uncertainties. Uranium results refer to the presence of U-238, U-234, or U-235.

Sample Number	OASIS dpm ± 1s	dpm/100cm ² ±1s
881A ✓	00A1148-001.001	2.53 0.22 52.5 (4.5)
881A ✓	00A1148-002.001	1.83 0.12 37.8 2.6
881A QC ✓	00A1148-003.001	1.11 0.10 23.0 2.0
881B ✓	00A1148-004.001	2.90 0.24 60.0 4.9
881B ✓	00A1148-005.001	5.87 0.33 121.6 (6.8)
881B QC ✓	00A1148-006.001	3.54 0.16 73.3 3.4
883A ✓	00A1148-007.001	3.44 0.25 71.4 (5.2)
883A ✓	00A1148-008.001	5.93 0.22 122.8 4.5
883A QC ✓	00A1148-009.001	3.73 0.17 77.4 3.5
883B ✓	00A1148-010.001	4.13 0.27 85.7 5.7
883B ✓	00A1148-011.001	4.33 0.28 89.8 (5.8)
883B QC ✓	00A1148-012.001	5.58 0.21 115.7 4.4
883C ✓	00A1148-013.001	0.04 0.05 0.9 1.1
883C ✓	00A1148-014.001	7.91 0.39 163.9 8.1
883C QC ✓	00A1148-015.001	6.94 0.25 143.8 5.2
439D ✓	00A1148-016.001	7.21 0.38 149.4 (7.8)
439D ✓	00A1148-017.001	5.12 0.32 106.2 6.6
439D QC ✓	00A1148-018.001	3.37 0.25 69.9 5.3
771D ✓	00A1148-019.001	11.76 0.46 243.6 (9.6)
771D ✓	00A1148-020.001	8.92 0.40 184.8 8.4
771D QC ✓	00A1148-021.001	9.89 0.24 204.9 4.9
T 331 ✓	00A1148-022.001	0.13 0.08 2.7 1.6
T 331 ✓	00A1148-023.001	0.96 0.14 19.8 (2.9)

T331 QC	00A1148-024.001	3.27	0.16	67.7	3.3
750E	00A1148-025.001	7.58	0.37	157.1	7.7
750E	00A1148-026.001	10.11	0.45	209.6	9.3
750E QC	00A1148-027.001	10.40	0.46	215.6	9.5
903A	00A1148-028.001	0.62	0.12	12.8 <i>min</i>	2.4
903A	00A1148-029.001	2.87	0.15	59.5	3.1
903A QC	00A1148-030.001	3.08	0.16	63.8	3.2
903A	00A1148-031.001	10.33	0.46	214.1 <i>min</i>	9.4
903A	00A1148-032.001	3.31	0.25	68.6	5.2
903A QC	00A1148-033.001	6.06	0.22	125.6	4.5
T331A	00A1148-034.001	10.72	0.31	222.2	6.3
T331A	00A1148-035.001	9.53	0.42	197.5	8.8
T331A QC	00A1148-036.001	7.51	0.38	155.6	7.9
575	00A1148-037.001	2.37	0.14	49.1	2.8
575 QC	00A1148-038.001	1.88	0.08	38.9	1.7
575	00A1148-039.001	2.21	0.09	45.7	1.8

Sample ID	Identified Peaks				Detection Sensitivity (dpm/100 cm ²)			
	Pu+Am	Pu-239	Am-241	U	Pu+Am	Pu-239	Am-241	U
881A 00A1148-001.001 >	No	No	No	No	79	70	10	79
881A 00A1148-002.001 >	No	No	No	No	32	28	4	32
881A 00A1148-003.001 QC	No	No	No	No	30	26	4	30
881B 00A1148-004.001 >	No	No	No	No	79	70	10	79
881B 00A1148-005.001 >	No	No	No	No	79	70	10	79
881B 00A1148-006.001 QC	No	No	No	No	30	26	4	30
883A 00A1148-007.001 >	No	No	No	No	79	70	10	79
883A 00A1148-008.001 >	No	No	No	No	30	26	4	30
883A 00A1148-009.001 QC	No	No	No	No	30	26	4	30
883B 00A1148-010.001 >	No	No	No	No	79	70	10	79
883B 00A1148-011.001 >	No	No	No	No	79	70	10	79
883B 00A1148-012.001 QC	No	No	No	No	30	26	4	30
00A1148-013.001	No	No	No	No	79	70	10	79
00A1148-014.001	No	No	No	No	79	70	10	79
00A1148-015.001	No	No	No	No	34	30	4	34
00A1148-016.001	No	No	No	No	79	70	10	79
00A1148-017.001	No	No	No	No	79	70	10	79
00A1148-018.001	No	No	No	No	79	70	10	79
771D 00A1148-019.001 >	No	No	No	No	70	61	8	70
771D 00A1148-020.001 >	No	No	No	No	79	70	10	79
771D 00A1148-021.001 QC	No	No	No	No	17	15	2	17
T331 00A1148-022.001 >	No	No	No	No	79	70	10	79
T331 00A1148-023.001 >	No	No	No	No	79	70	10	79
T331 00A1148-024.001 QC	No	No	No	No	30	26	4	30
750E 00A1148-025.001 >	No	No	No	No	79	70	10	79
750E 00A1148-026.001 >	No	No	No	No	79	70	10	79
750E 00A1148-027.001 QC	No	No	No	No	79	70	10	79
903A 00A1148-028.001	No	No	No	No	79	70	10	79

523

00A1148-029.001	No	No	No	No	30	26	4	30
00A1148-030.001	No	No	No	No	30	26	4	30
00A1148-031.001	No	No	No	No	79	70	10	79
00A1148-032.001	No	No	No	No	79	70	10	79
00A1148-033.001	No	No	No	No	30	26	4	30
00A1148-034.001	No	No	No	No	30	26	4	30
00A1148-035.001	No	No	No	No	75	66	9	75
00A1148-036.001	No	No	No	No	79	70	10	79
00A1148-037.001	No	No	No	No	30	26	4	30
00A1148-038.001	No	No	No	No	12	10	1	12
00A1148-039.001	No	No	No	No	12	10	1	12

Approved by:

C. J. Bianconi 5/10/00
C. J. Bianconi, CHP
B771 Radiological Engineering
303.966.7262
303.212.5706 dp

524

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 09:53:07

Sample ID: 881A 00A1148-001.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 20, 2000 08:39:27
Analysis Date: April 24, 2000 09:52:59
Procedure: polonium210 samples
Device: Oasis:02:01
Analysis Method: ROI Analysis
Spectrum File: 00000290.OXS LiveTime: 10,800.00

Calibrations:

Energy = 2.127E+02 +2.333E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: March 14, 2000 09:19:39 Std: 2:1 energy cal
Shape not Calibrated.
Efficiency = 3.393E-01 ± 4.339E-03
Calibration Date: August 11, 1999 13:14:16 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5814.6	2.3
2	Po214	7420.0	7770.1	7594.8	1.2
3	Po212	8521.5	8850.6	8684.3	2.3
4	Po210	2263.7	5402.1	5177.6	2.3

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.2 ± 1.0	0.76	1.33E-03 ± 5.70E-03	Unknown
Po214	-0.1 ± 0.1	0.07	-3.84E-04 ± 3.84E-04	Unknown
Po212	0.9 ± 1.0	0.14	4.79E-03 ± 5.58E-03	Unknown
Po210	154.7 ± 13.0	13.35	0.859 ± 0.072	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	3.92E-03 ± 0.017	9.29E-02
Po214	Po214	1.000	-1.13E-03 ± 1.13E-03	5.90E-02
Po212		1.000	0.014 ± 0.016	6.50E-02
Po210	Po210	1.000	2.532 ± 0.215	2.48E-01

Activity reported as of April 20, 2000 08:39:27

ANALYSIS REVIEWED BY: *Shawn P. [Signature]*

APPROVED BY: *CJ Brannon 5/8/00*

525

84

OASIS - MCA

File Edit View Acq Param Tools Report Help

Library: **Am241**

QAS_STD.MDB

4096

LOG

Lin Log Sqrt

Peak

Presets ROIs Controls Display Info Aux Disp

4095

881A 00A1148-001.001

Spectrum ID

System Date: 09 May 2000 17:53:19

Message Window

Channel: 1011 Elapsed Real Time: 10800.05 Elapsed Live Time: 10800.00 Dead Time: 0.0

Energy: 2571.0 Counts: 0 ROI: Integrat: 168 Peak: 5.177.63 FWHM: 2.33

526

Oasis Device # 2

RFETS; Golden, CO
Apr 21, 2000 15:17:03

Sample ID: 881A 00A1148-002.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 21, 2000 07:49:49
Analysis Date: April 21, 2000 15:14:19
Procedure: polonium210 samples
Device: Oasis:02:01
Analysis Method: ROI Analysis
Spectrum File: 00000297.OXS LiveTime: 26,514.17

Calibrations:

Energy = 2.127E+02 +2.333E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: March 14, 2000 09:19:39 Std: 2:1 energy cal
Shape not Calibrated.
Efficiency = 3.393E-01 ± 4.339E-03
Calibration Date: August 11, 1999 13:14:16 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5814.6	2.3
2	Po214	7420.0	7770.1	7594.8	1.2
3	Po212	8521.5	8850.6	8684.3	1.2
4	Po210	2263.7	5402.1	4683.0	4.7

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	1.5 ± 2.3	2.46	3.50E-03 ± 5.31E-03	Unknown
Po214	0.0 ± 0.0	0.00	0.00E+00 ± 0.00E+00	Unknown
Po212	-0.6 ± 0.6	0.61	-1.39E-03 ± 1.39E-03	Unknown
Po210	273.8 ± 18.2	36.21	0.620 ± 0.041	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.010 ± 0.016	6.17E-02
Po214	Po214	1.000	0.00E+00 ± 0.00E+00	1.80E-02
Po212	Po212	1.000	-4.09E-03 ± 4.09E-03	3.99E-02
Po210	Po210	1.000	1.826 ± 0.124	1.86E-01

Activity reported as of April 21, 2000 07:49:49

ANALYSIS REVIEWED BY: *Steve P. Zapp*

APPROVED BY: *C. J. Bianconi 5/8/00*

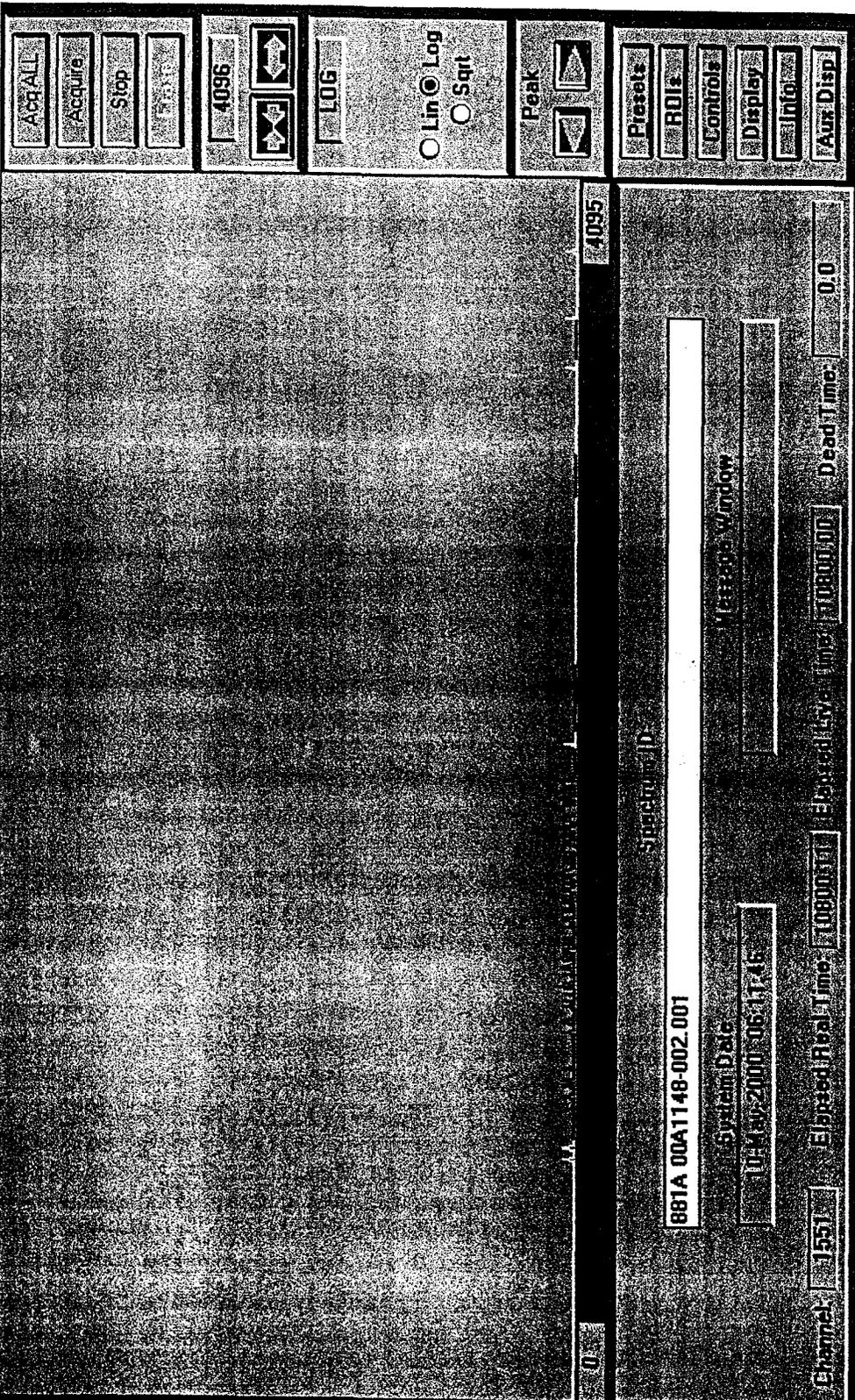
DASIS - MCA

File Edit View AcqParam Tools Report Close Help

Library: **DAS STD.MDB**

Nuclide: **Am241**

Static: **00000292.OXS**



4095

Spectrum ID: **881A 00A1148-002.001**

System Date: **10-MAR-2000 06:17:46**

Elapsed Real Time: **10800.00** | Peak Coll. Cy. Top: **10800.00** | Dead Time: **0.0**

Channel: **1551**

Energy: **3866.8** | Counts: **0** | ROI: **127** | Integral: **5.05079** | Peak: **5.05079** | FWHM: **2.39**

Acq ALL

Acquiring

Stop

4096

LOG

Lin Log Sqrt

Peak

Presets

ROIs

Controls

Display

Info

Aux Disp

508

Sample ID: 00A1148-003.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: May 02, 2000 13:02:56
Analysis Date: May 03, 2000 07:11:03
Procedure: Po210 count
Device: Oasis:01:01
Analysis Method: ROI Analysis
Spectrum File: 00000522.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $3.865E+01 + 2.790E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
Calibration Date: April 03, 2000 17:45:10 **Std:** 1:1 energy cal
 Shape not Calibrated.
Efficiency = $3.041E-01 \pm 4.004E-03$
Calibration Date: April 07, 2000 09:49:29 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	4.2
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	2.8
4 Po210	Po210	2180.3	5343.3	4531.3	2.8

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	19.7 \pm 4.7	1.33	0.041 \pm 9.75E-03	Unknown
Po214	1.3 \pm 1.6	0.67	2.78E-03 \pm 3.26E-03	Unknown
Po212	11.3 \pm 4.0	2.67	0.024 \pm 8.28E-03	Unknown
Po210	161.7 \pm 13.9	19.33	0.337 \pm 0.029	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.135 \pm 0.032	5.21E-02
Po214	Po214	1.000	9.14E-03 \pm 0.011	4.23E-02
Po212	Po212	1.000	0.078 \pm 0.027	6.61E-02
Po210	Po210	1.000	1.108 \pm 0.097	1.47E-01

Activity reported as of May 02 2000 13:02:56

ANALYSIS REVIEWED BY: *Alan P. Goff*

APPROVED BY: *CJ Bianconi 5/3/00*

spike value:
 22.980 d/m
 Pu 239

529

DASIS - MCA

File Edit View Setup Reports Help

Library: **DAS_STD.MDB** Nuclide: **Am241** 1-Static: 00000522.OXS

Acq ALL Acquire Stop

4096

LOG

Lin Log Sqrt

Peak

Presets ROIs Controls Display Info Aux Disp

4095

00A1148-003.001

System Date: 09 May 2000 13:58:08

Channel: 1986 Elapsed Real Time: 28800.077 Elapsed Live Time: 28800.000 Dead Time: 0.0

Energy: 5581.3 Counts: 0 ROI: Integral: 21 Peak: 5.826.04 FWHM: 4.19

Oasis Device # 2

RFETS; Golden, CO
Apr 19, 2000 07:30:58

Sample ID: 881B coupon 00A1148-005.001 Type: Unknown

Batch ID: unknown
Acquisition Start: April 18, 2000 13:05:01
Analysis Date: April 19, 2000 07:30:52
Procedure: polonium210 samples
Device: Oasis:02:01
Analysis Method: ROI Analysis
Spectrum File: 00000282.OXS LiveTime: 10,800.00

Calibrations:

Energy = $2.127E+02 + 2.333E+00 * Chn$ Coeff. of Correlation: -0.998
Calibration Date: March 14, 2000 09:19:39 Std: 2:1 energy cal
Shape not Calibrated.
Efficiency = $3.393E-01 \pm 4.339E-03$
Calibration Date: August 11, 1999 13:14:16 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount:

Aliquot Amount: 1.000 \pm 0.000 samp
1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1 Po218	Po218	5552.6	6077.8	5814.6	1.2
2 Po214	Po214	7420.0	7770.1	7594.8	1.2
3 Po212		8521.5	8850.6	8684.3	1.2
4 Po210	Po210	2263.7	5402.1	5152.0	2.7

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-1.0 \pm 0.5	1.00	-5.56E-03 \pm 2.78E-03	Unknown
Po214	0.0 \pm 0.0	0.00	0.00E+00 \pm 0.00E+00	Unknown
Po212	-0.3 \pm 0.3	0.25	-1.39E-03 \pm 1.39E-03	Unknown
Po210	358.3 \pm 19.4	14.75	1.990 \pm 0.108	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-1.64E-02 \pm 8.19E-03	1.05E-01
Po214	Po214	1.000	0.00E+00 \pm 0.00E+00	4.43E-02
Po212		1.000	-4.09E-03 \pm 4.09E-03	7.44E-02
Po210	Po210	1.000	5.866 \pm 0.327	2.76E-01

Activity reported as of April 18, 2000 13:05:01

ANALYSIS REVIEWED BY: J. Robert 07/16/00

APPROVED BY: _____

OASIS - MCA X
 File Edit View Acq/Param Tools Report Close Help
 Library: DAS_STD.MDB Am241
 5:5 Stat: 00000282.DXS
 Acq ALL Acquire Stop ERSP
 4096 LOG
 Lin Log Sqrt
 Peak
 Presets ROIs Controls Display Info FAUR Disp
 0 4095
 Spectrum ID
 881B coupon 00A1148-005.001
 System Date
 10-Mar-2000 06:15:43
 Channel: 11692 Elapsed Real Time: 257:58:07.56 Elapsed Live Time: 257:58:07.56 Dead Time: 0.0
 Energy: 42317 Counts: 5 ROI: Integral: 9.871 Peak: 5.189.12 FWHM: 125.20

532

Sample ID: 00A1148-006.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: May 01, 2000 15:37:58
Analysis Date: May 02, 2000 06:53:01
Procedure: Po210 count
Device: Oasis:01:02
Analysis Method: ROI Analysis
Spectrum File: 00000521.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $5.823E+01 + 2.790E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
Calibration Date: April 07, 2000 14:55:56 **Std:** 1:2 energy cal
 Shape not Calibrated.
Efficiency = $3.089E-01 \pm 4.062E-03$
Calibration Date: April 07, 2000 15:15:30 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	6038.1	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8775.5	3.5
4 Po210	Po210	2180.3	5343.3	5234.5	3.3

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	41.0 \pm 6.4	0.00	0.085 \pm 0.013	Unknown
Po214	8.3 \pm 3.1	0.68	0.017 \pm 6.41E-03	Unknown
Po212	48.0 \pm 6.9	0.00	0.100 \pm 0.014	Unknown
Po210	524.7 \pm 23.4	12.31	1.093 \pm 0.049	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.276 \pm 0.043	1.82E-02
Po214	Po214	1.000	0.056 \pm 0.021	4.21E-02
Po212	Po212	1.000	0.324 \pm 0.047	1.82E-02
Po210	Po210	1.000	3.538 \pm 0.164	1.19E-01

Activity reported as of May 01, 2000 15:37:58
ANALYSIS REVIEWED BY: *[Signature]*
APPROVED BY: *[Signature]* 5/8/00

spike activity:
 22,990 d/m
 Pu 239

533

OASIS - MCA

Library: DAS_STD.MDB Am241

Acq ALL Acquire Stop

4096 LOG

Lin Log Sqrt

Peak

Presets RDI Controls Display Info FAUK Disp

4095

PRESETS

Real Time (secs) Live Time (secs) Peak (cnts) Integral (ch1)

Region of Use

Enable Presets

Energy: 5174.5 Counts: 1 RDI: Integral: 537 Peak: 5234.46 FWHM: 3.35

00A1148-006.001

Oasis Device # 2

RFETS; Golden, CO

Apr 21, 2000 15:18:44

Sample ID: 881A 00A1148-007.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 21, 2000 07:40:11
Analysis Date: April 21, 2000 15:12:57
Procedure: polonium210 samples
Device: Oasis:02:04
Analysis Method: ROI Analysis
Spectrum File: 00000298.OXS LiveTime: 10,800.00

Calibrations:
Energy = 1.412E+02 +2.389E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 05, 2000 09:30:14 Std: AS 4188
Shape not Calibrated.
Efficiency = 3.398E-01 ± 4.596E-03
Calibration Date: April 05, 2000 09:40:39 Std: AS 4188

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

Table with 6 columns: ROI ID #, ASSOCIATED NUCLIDE, EXTENTS START, END, PK EN (keV), FWHM (keV). Rows include Po218, Po214, Po212, and Po210.

ROI ANALYSIS RESULTS

Table with 5 columns: ROI ID, NET COUNTS, BKG/INTERF, CPM, ROI TYPE. Rows include Po218, Po214, Po212, and Po210.

NUCLIDE ANALYSIS RESULTS

Table with 5 columns: ROI ID, ASSOC NUC, EMM. PROB, ACTIVITY (dpm/samp), MDA (dpm). Rows include Po218, Po214, Po212, and Po210.

Activity reported as of April 21, 2000 07:40:11

ANALYSIS REVIEWED BY: [Signature]

APPROVED BY: [Signature] 5/8/00

535

DASIS - MCA

Library: DAS STD.MDB Nuclide: Am241

5-Static: 00000298.DXS

4095

Acq ALL Acquire Stop

4096

LOG

Lim Log Sqrt

Peak

Presets ROIs Controls Display Info FAUK Disp

881A 00A1148-007.001

Spectrum ID

System Date: 10-May-2000 06:18:58

Elapsed Real Time: 00:00:00.000

Dead Time: 0.0

Energy: 4958.6 Counts: 0 ROI: 228 Integral: 5.026.90 Peak: 5.026.90 FWHM: 2.39

Sample ID: 00A1148-008.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: May 02, 2000 16:31:11
Analysis Date: May 03, 2000 08:08:44
Procedure: Po210 count
Device: Oasis:01:02
Analysis Method: ROI Analysis
Spectrum File: 00000517.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = 5.823E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 07, 2000 14:55:56 Std: 1:2 energy cal
 Shape not Calibrated.
 Efficiency = 3.089E-01 ± 4.062E-03
 Calibration Date: April 07, 2000 15:15:30 Std: TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1	Po218	5550.0	6104.5	5826.0	2.8
2	Po214	6588.5	7874.7	7229.6	2.8
3	Po212	8393.8	8808.6	8599.7	2.8
4	Po210	2180.3	5343.3	5245.6	6.5

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	6.0 ± 2.4	0.00	0.013 ± 5.10E-03	Unknown
Po214	0.3 ± 1.2	0.68	6.58E-04 ± 2.52E-03	Unknown
Po212	3.0 ± 1.7	0.00	6.25E-03 ± 3.61E-03	Unknown
Po210	878.7 ± 30.0	12.31	1.831 ± 0.062	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.040 ± 0.017	1.82E-02
Po214	Po214	1.000	2.13E-03 ± 8.17E-03	4.21E-02
Po212	Po212	1.000	0.020 ± 0.012	1.82E-02
Po210	Po210	1.000	5.926 ± 0.217	1.19E-01

Activity reported as of May 02, 2000 16:31:11

ANALYSIS REVIEWED BY: *Anna P. Zeff*

APPROVED BY: *CJ Bianconi 5/8/00*

spike value:
 22.892 dpm
 pu 239

537

0 hr
902

OASIS - MCA

Library: **OAS_STD.MDB** Nuclide: **Am241**

Acq ALL Acquire Stop Process

4096 LOG

Lin Log Sqrt

Peak

Presets ROIs Controls Display Info

Aux Disp

0 4095

Spectrum ID

00A1148-008.001

System Date: 03-May-2000 08:19:17

Channel: 1698 Elapsed Real Time: 28900.77 Elapsed Live Time: 28800.00 Dead Time: 0.0

Energy: 4797.9 Counts: 2 ROI Integral: 691 Peak: 5245.63 FWHM: 6.51

Sample ID: 00A1148-009.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: May 03, 2000 08:42:23
Analysis Date: May 03, 2000 16:42:46
Procedure: Po210 count
Device: Oasis:01:04
Analysis Method: ROI Analysis
Spectrum File: 00000527.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $8.600E+01 + 2.746E+00 * Chn$ **Coeff. of Correlation:** -0.998
Calibration Date: April 12, 2000 10:28:56 **Std:** 1:4 energy cal
 Shape not Calibrated.
Efficiency = $3.084E-01 \pm 4.055E-03$
Calibration Date: April 12, 2000 11:45:10 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.2	2.7
2 Po214	Po214	6588.5	7874.7	7232.4	15.8
3 Po212	Po212	8393.8	8808.6	8600.1	2.7
4 Po210	Po210	2180.3	5343.3	5186.2	3.6

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	2.7 \pm 2.2	1.33	$5.56E-03 \pm 4.61E-03$	Unknown
Po214	-0.7 \pm 0.7	0.67	$-1.39E-03 \pm 1.39E-03$	Unknown
Po212	6.0 \pm 2.4	0.00	$0.013 \pm 5.10E-03$	Unknown
Po210	552.7 \pm 23.9	11.33	1.151 ± 0.050	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.018 ± 0.015	$5.14E-02$
Po214	Po214	1.000	$-4.50E-03 \pm 4.50E-03$	$4.17E-02$
Po212	Po212	1.000	0.041 ± 0.017	$1.83E-02$
Po210	Po210	1.000	3.734 ± 0.169	$1.15E-01$

Activity reported as of May 03, 2000 08:42:23

ANALYSIS REVIEWED BY: *Mark P. Kelly*

APPROVED BY: *CJ Bianconi 5/8/00*

539

OASIS - MCA

2-Static: 00000527.DXS

Am241

DAS_STD.MDB

Acq ALL

Acquire

Stop

4096

LOG

Lin Log

Sqrt

Peak

Presets

ROIs

Controls

Display

Info

Aux Disp

0

4095

Spectrum ID

00A1148-009.001

System Date

05 May 2000 15:15:11

Channel: 1534

Elapsed Real Time: 28800.17

Elapsed Live Time: 28800.00

Dead Time: 0.0

Energy: 4298.6

Counts: 0

ROI: [REDACTED]

Integral: 564

Peak: 5386.24

FWHM: 3.57

Oasis Device # 2

RFETS; Golden, CO
Apr 18, 2000 14:46:41

Sample ID: 883B coupon 00A1148-010.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 18, 2000 13:06:25
Analysis Date: April 18, 2000 14:46:35
Procedure: polonium210 samples
Device: Oasis:02:03
Analysis Method: ROI Analysis
Spectrum File: 00000284.OXS LiveTime: 6,005.32

Calibrations:

Energy = 1.604E+02 +2.389E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:34:53 Std: 2:3 energy cal.
Shape not Calibrated.
Efficiency = 3.357E-01 ± 4.547E-03
Calibration Date: April 05, 2000 09:20:34 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5815.3	1.2
2	Po214	7420.0	7770.1	7595.1	1.2
3	Po212	8521.5	8850.6	8686.9	1.2
4	Po210	2263.7	5322.8	5163.1	2.4

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-0.1 ± 0.1	0.14	-1.39E-03 ± 1.39E-03	Unknown
Po214	-0.3 ± 0.2	0.28	-2.78E-03 ± 1.96E-03	Unknown
Po212	0.0 ± 0.0	0.00	0.00E+00 ± 0.00E+00	Unknown
Po210	140.3 ± 12.1	5.70	1.402 ± 0.121	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-4.14E-03 ± 4.14E-03	1.19E-01
Po214	Po214	1.000	-8.27E-03 ± 5.85E-03	1.36E-01
Po212		1.000	0.00E+00 ± 0.00E+00	8.05E-02
Po210	Po210	1.000	4.175 ± 0.365	3.30E-01

Activity reported as of April 18, 2000 13:06:25

ANALYSIS REVIEWED BY: Allen P. Zapp

APPROVED BY: C. J. Bianconi 5/8/00

541

All Acquire Stop [Icon]

4095 LOG Lin Log Sqrt

Peak [Icon]

Presets ROI's Controls Display Info Aux Disp

Static: 00000284.DXS

Am241

OAS_STD.MDB

Spectrum ID: 883B coupon 00A1148-010.001

System Date: 11/19/2000 06:27:57

Channel: 2327

Energy: 5720.1

Message Window

Dead Time: 0.0

Counts: 0

ROI: 0

Peak: 5.81529

FWHM: 0.00

542

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 09:54:10

Sample ID: 883B coupon 00A1148-011.001 Type: Unknown

Batch ID: unknown
Acquisition Start: April 18, 2000 13:06:24
Analysis Date: April 24, 2000 09:54:04
Procedure: polonium210 samples
Device: Oasis:02:02
Analysis Method: ROI Analysis
Spectrum File: 00000283.OXS LiveTime: 10,800.00

Calibrations:

Energy = $1.436E+01 + 2.491E+00 * Chn$ Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:25:18 Std: 2:2 energy calibration
Shape not Calibrated.
Efficiency = $3.436E-01 \pm 4.641E-03$
Calibration Date: April 05, 2000 09:05:57 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount:

1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
1 Po218	Po218	5552.6	6077.8	5814.5	2.5
2 Po214	Po214	7420.0	7770.1	7593.4	2.5
3 Po212		8521.5	8850.6	8687.1	2.5
4 Po210	Po210	2263.7	5322.8	5159.2	4.7

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.5 ± 1.5	1.50	$2.78E-03 \pm 8.56E-03$	Unknown
Po214	0.3 ± 1.1	0.75	$1.39E-03 \pm 6.05E-03$	Unknown
Po212	1.0 ± 1.0	0.00	$5.56E-03 \pm 5.56E-03$	Unknown
Po210	268.0 ± 16.8	12.00	1.489 ± 0.093	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	$8.09E-03 \pm 0.025$	1.17E-01
Po214	Po214	1.000	$4.04E-03 \pm 0.018$	9.53E-02
Po212		1.000	0.016 ± 0.016	4.38E-02
Po210	Po210	1.000	4.334 ± 0.278	2.50E-01

Activity reported as of April 18, 2000 13:06:24

ANALYSIS REVIEWED BY: *[Signature]*

APPROVED BY: *C. J. Bianconi 5/8/00*

543

All Acquire Stop Ready

4095 LOG

Lin Log Split

Peak Presets ROIs Controls Display Info Aux Disp

OAS_STD.MDB Am241

883B coupon ODA1148-011.001

System Date: 10-May-2000 06:25:07

Channel: 1405 Elapsed Real Time: 00:00:02.281

Energy: 3513.6 Counts: 0 ROI: 281

Peak: 5.159/22 FWHM: 4.67

514

Sample ID: 00A1148-012.001 Type: Unknown

Batch ID: unknowns
Acquisition Start: May 03, 2000 16:57:27
Analysis Date: May 04, 2000 07:06:32
Procedure: Po210 count
Device: Oasis:01:03
Analysis Method: ROI Analysis
Spectrum File: 00000538.OXS LiveTime: 28,800.00

Calibrations:
Energy = 6.596E+01 +2.779E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 24, 2000 13:03:27 Std: 1:3 Energy Cal
Shape not Calibrated.
Efficiency = 3.120E-01 ± 4.098E-03
Calibration Date: April 24, 2000 10:05:48 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	6055.4	2.8
2 Po214	Po214	6588.5	7874.7	7231.0	2.8
3 Po212	Po212	8393.8	8808.6	8601.2	2.8
4 Po210	Po210	2180.3	5343.3	5179.9	3.9

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	18.7 ± 4.6	1.33	0.039 ± 9.52E-03	Unknown
Po214	-1.7 ± 1.7	2.67	-3.47E-03 ± 3.47E-03	Unknown
Po212	9.0 ± 3.0	0.00	0.019 ± 6.25E-03	Unknown
Po210	836.0 ± 29.4	18.00	1.742 ± 0.061	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.125 ± 0.031	5.08E-02
Po214	Po214	1.000	-1.11E-02 ± 0.011	6.44E-02
Po212	Po212	1.000	0.060 ± 0.020	1.81E-02
Po210	Po210	1.000	5.582 ± 0.210	1.38E-01

Activity reported as of May 03, 2000 16:57:27

ANALYSIS REVIEWED BY: [Signature]
APPROVED BY: [Signature] 5/4/00

spike value
22.892 dpm
Pu 239

545

8-24

DASIS - MCA

File Edit View Acq Param Log Reports Data Help

Library: **DAS STD.MDB** Nucclide: **Am241**

Acq ALL Acquire Stop

4096 LOG

Lin Log Sqrt

Peak

Presets ADIs Controls Display Info Aux Disp

00A1148-012.001

Spectrum D

System Date: 04-May-2000 07:02:11

Channel: 1751 Elapsed Real Time: 28800.05 Elapsed Live Time: 28800.00 Dead Time: 0.0

Energy: 4933.2 Counts: 3 ROI: 854 Integral: 5:179.88 Peak: 3.94

514

Sample ID: 00A1148-014.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: April 25, 2000 14:44:23
Analysis Date: April 25, 2000 18:07:01
Procedure: Po210 count
Device: Oasis:01:03
Analysis Method: ROI Analysis
Spectrum File: 00000491.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 6.596E+01 +2.779E+00 * Chn **Coeff. of Correlation:** -0.998
Calibration Date: April 24, 2000 13:03:27 **Std:** 1:3 Energy Cal
 Shape not Calibrated.
Efficiency = 3.120E-01 ± 4.098E-03
Calibration Date: April 24, 2000 10:05:48 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5827.5	2.8
2 Po214	Po214	6588.5	7874.7	7231.0	2.8
3 Po212	Po212	8393.8	8808.6	8601.2	416.9
4 Po210	Po210	2180.3	5343.3	4715.7	4.9

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	1.7 ± 1.4	0.33	9.29E-03 ± 7.89E-03	Unknown
Po214	1.6 ± 1.4	0.42	8.77E-03 ± 7.90E-03	Unknown
Po212	0.0 ± 0.0	0.05	-2.60E-04 ± 2.60E-04	Unknown
Po210	444.1 ± 21.2	6.94	2.467 ± 0.118	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.030 ± 0.025	8.25E-02
Po214	Po214	1.000	0.028 ± 0.025	8.71E-02
Po212	Po212	1.000	-8.35E-04 ± 8.35E-04	6.12E-02
Po210	Po210	1.000	7.907 ± 0.392	2.06E-01

Activity reported as of April 25, 2000 14:44:23

ANALYSIS REVIEWED BY: *[Signature]*

APPROVED BY: *[Signature]* 5/9/00

547

OASIS MCA
 DAS STD.MDB Am241
 Library: Nucleidec
 DAS STD.MDB Am241
 Acquire Stop
 4096 268
 Lin Log Sqrt Auto
 Peak
 Presets ROIs Controls Display Info Aux Disp
 Spectrum ID: 00A1148-014.001
 System Data: 25-Apr-2000 18:09:05
 Message Window
 Channel: 3740 Elapsed Real Time: 10800.03 Elapsed Live Time: 10800.00 Dead Time: 0.0
 Energy: 10461.3 Counts: 0 ROI: Integral: Peak: FWHM:

815

Sample ID: 00A1148-015.001

Type: Unknown

Batch ID: unknowns

Acquisition Start: May 05, 2000 07:09:38

Analysis Date: May 05, 2000 14:25:24

Procedure: Po210 count

Device: Oasis:01:04

Analysis Method: ROI Analysis

Spectrum File: 00000545.OXS LiveTime: 25,200.00

Calibrations:

Energy = 8.600E+01 +2.746E+00 * Chn Coeff. of Correlation: -0.998

Calibration Date: April 12, 2000 10:28:56 Std: 1:4 energy cal

Shape not Calibrated.

Efficiency = 3.084E-01 ± 4.055E-03

Calibration Date: April 12, 2000 11:45:10 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount:

1.000 ± 0.000 samp

Aliquot Amount:

1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	6048.6	3.4
2 Po214	Po214	6588.5	7874.7	7232.4	2.7
3 Po212	Po212	8393.8	8808.6	8723.7	4.4
4 Po210	Po210	2180.3	5343.3	5101.1	6.0

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	24.0 ± 4.9	0.00	0.057 ± 0.012	Unknown
Po214	10.8 ± 3.6	1.17	0.026 ± 8.48E-03	Unknown
Po212	33.8 ± 6.0	1.17	0.081 ± 0.014	Unknown
Po210	898.9 ± 30.3	11.08	2.140 ± 0.072	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.185 ± 0.038	2.09E-02
Po214	Po214	1.000	0.084 ± 0.028	5.54E-02
Po212	Po212	1.000	0.261 ± 0.046	5.54E-02
Po210	Po210	1.000	6.940 ± 0.251	1.27E-01

Activity reported as of May 05, 2000 07:09:38

ANALYSIS REVIEWED BY:

[Signature]

APPROVED BY:

[Signature] 5/9/00

549

OASIS MCA X
 DAS_STD.MDB Am241
 Acquire Acquire Stop 4096
 LOG Lim Log Sqrt Peak
 Presets ROI's Controls Display Info Aux Disp
 Spectrum ID: 00A1148-015.001
 System Date: 05 May 2000 14:32:04
 Channel: 1263 Elapsed Real Time: 25200.03 Elapsed Live Time: 25200.00 Dead Time: 0.0
 Energy: 3556.1 Counts: 0 ROI: Integral: 910 Peak: 5.101.10 FWHM: 6.04

Sample ID: 00A1148-016.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 25, 2000 14:34:47
 Analysis Date: April 25, 2000 18:32:19
 Procedure: Po210 count
 Device: Oasis:01:01
 Analysis Method: ROI Analysis
 Spectrum File: 00000490.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 3.865E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 03, 2000 17:45:10 Std: 1:1 energy cal
 Shape not Calibrated.
 Efficiency = 3.041E-01 ± 4.004E-03
 Calibration Date: April 07, 2000 09:49:29 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
 Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	1.4
4 Po210	Po210	2180.3	5343.3	5150.8	3.8

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.5 ± 1.0	0.47	2.95E-03 ± 5.62E-03	Unknown
Po214	0.7 ± 1.0	0.28	3.99E-03 ± 5.59E-03	Unknown
Po212	-0.1 ± 0.1	0.09	-5.21E-04 ± 3.68E-04	Unknown
Po210	394.4 ± 20.0	6.56	2.191 ± 0.111	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	9.71E-03 ± 0.018	9.16E-02
Po214	Po214	1.000	0.013 ± 0.018	8.21E-02
Po212	Po212	1.000	-1.71E-03 ± 1.21E-03	6.83E-02
Po210	Po210	1.000	7.207 ± 0.378	2.07E-01

Activity reported as of April 25, 2000 14:34:47

ANALYSIS REVIEWED BY: *[Signature]*

APPROVED BY: *[Signature]* 5/9/00

SIS - MDA

Edit View Acquire Tools Reports Close Help

Library: Nucleide Am241

QAS_STD.MDB

Acquire

Acquire

Stop

Erase

4096

LOG

Lim Log

Scrl

Peak

Presets

ROI

Control

Display

Info

Auto Disc

4096

Spectrum ID

00A1148-016.001

System Data

25-Apr-2000 18:25:06

Elapsed Real Time: 10800.07

Elapsed Live Time: 10800.00

Peak Time: 0.0

Energy: 7188.3

Counts: 0

ROI

Integral

Peak: 7229.64

FWHM: 279

550

Sample ID: 00A1148-017.001 Type: Unknown

Batch ID: unknowns
Acquisition Start: April 25, 2000 11:09:58
Analysis Date: April 25, 2000 14:11:29
Procedure: Po210 count
Device: Oasis:01:01
Analysis Method: ROI Analysis
Spectrum File: 00000486.OXS LiveTime: 10,800.00

Calibrations:

Energy = $3.865E+01 + 2.790E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: April 03, 2000 17:45:10 Std: 1:1 energy cal
Shape not Calibrated.
Efficiency = $3.041E-01 \pm 4.004E-03$
Calibration Date: April 07, 2000 09:49:29 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount:

1.000 ± 0.000 samp

Aliquot Amount:

1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
1	Po218	5550.0	6104.5	5826.0	2.8
2	Po214	6588.5	7874.7	7229.6	2.8
3	Po212	8393.8	8808.6	8599.7	1.4
4	Po210	2180.3	5343.3	5178.7	6.5

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.5 ± 1.0	0.47	$2.95E-03 \pm 5.62E-03$	Unknown
Po214	1.7 ± 1.4	0.28	$9.55E-03 \pm 7.88E-03$	Unknown
Po212	-0.1 ± 0.1	0.09	$-5.21E-04 \pm 3.68E-04$	Unknown
Po210	280.4 ± 17.0	6.56	1.558 ± 0.094	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	$9.71E-03 \pm 0.018$	9.16E-02
Po214	Po214	1.000	0.031 ± 0.026	8.21E-02
Po212	Po212	1.000	$-1.71E-03 \pm 1.21E-03$	6.83E-02
Po210	Po210	1.000	5.124 ± 0.317	.2.07E-01

Activity reported as of April 25, 2000 11:09:58

ANALYSIS REVIEWED BY:

[Signature]

APPROVED BY:

CJ Bianconi 5/9/00

Sample ID: 00A1148-018.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: May 04, 2000 13:14:27
 Analysis Date: May 04, 2000 16:17:04
 Procedure: Po210 count
 Device: Oasis:01:03
 Analysis Method: ROI Analysis
 Spectrum File: 00000541.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 6.596E+01 + 2.779E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 24, 2000 13:03:27 Std: 1:3 Energy Cal
 Shape not Calibrated.
 Efficiency = 3.120E-01 ± 4.098E-03
 Calibration Date: April 24, 2000 10:05:48 Std: TS4189

External Recovery No Ext.Recovery

Air Filter Analysis Parameters:
 Sample Type: Unknown
 Air Filter Time on: May 04, 2000 13:12:09
 Air Filter Time off: May 04, 2000 13:12:09
 Total Collect Time: 0.000 hours
 Air Volume: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1	Po218	5550.0	6104.5	5827.5	2.8
2	Po214	6588.5	7874.7	7231.0	2.8
3	Po212	8393.8	8808.6	8601.2	2.8
4	Po210	2180.3	5343.3	5174.3	3.7

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	5.5 ± 2.5	0.50	0.031 ± 0.014	Unknown
Po214	0.0 ± 1.1	1.00	0.00E+00 ± 6.21E-03	Unknown
Po212	4.0 ± 2.0	0.00	0.022 ± 0.011	Unknown
Po210	189.3 ± 14.1	6.75	1.051 ± 0.078	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm/samp)
Po218	Po218	1.000	0.098 ± 0.044	9.45E-02
Po214	Po214	1.000	0.00E+00 ± 0.020	1.14E-01
Po212	Po212	1.000	0.071 ± 0.036	4.82E-02
Po210	Po210	1.000	3.370 ± 0.254	2.18E-01

Activity reported as of May 04, 2000 13:14:27

ANALYSIS REVIEWED BY: *John P. Sully*

APPROVED BY: *CJ Bianconi 5/9/00*

OASIS - MCA

File Edit View Acq Params Tool Reports Data Help

Library: **OAS_STD.MDB** Am241

1095

Accumulate Acquire Stop Erase

1096

106

Lin 1500 5000

Peak

1095

00A1148-018.001

System Date: 09 May 2000 15:56:24

Elapsed Real Time: 10800.05 Elapsed Live Time: 10800.00 Dead Time: 0.0

Channel: 1111

Energy: 3152.9 Counts: 0 ROI: 196 Peak: 5174.32 FWHM: 371

556

Sample ID: 00A1148-019.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 24, 2000 08:34:57
 Analysis Date: April 24, 2000 12:00:58
 Procedure: Po210 count
 Device: Oasis:01:01
 Analysis Method: ROI Analysis
 Spectrum File: 00000460.OXS **LiveTime:** 12,297.00

Calibrations:
 Energy = 3.865E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 03, 2000 17:45:10 Std: 1:1 energy cal
 Shape not Calibrated.
 Efficiency = 3.041E-01 ± 4.004E-03
 Calibration Date: April 07, 2000 09:49:29 Std: TS4189

External Recovery No Ext.Recovery
 Original Sample Amount: 1.000 ± 0.000 samp
 Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	1.4
3 Po212	Po212	8393.8	8808.6	8599.7	1.4
4 Po210	Po210	2180.3	5343.3	5187.0	3.5

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.5 ± 1.0	0.53	2.28E-03 ± 4.95E-03	Unknown
Po214	-0.3 ± 0.1	0.32	-1.56E-03 ± 6.38E-04	Unknown
Po212	-0.1 ± 0.1	0.11	-5.21E-04 ± 3.68E-04	Unknown
Po210	732.5 ± 27.2	7.47	3.574 ± 0.133	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	7.48E-03 ± 0.016	8.30E-02
Po214	Po214	1.000	-5.14E-03 ± 2.10E-03	7.41E-02
Po212	Po212	1.000	-1.71E-03 ± 1.21E-03	6.11E-02
Po210	Po210	1.000	11.755 ± 0.463	1.92E-01

Activity reported as of April 24, 2000 08:34:57

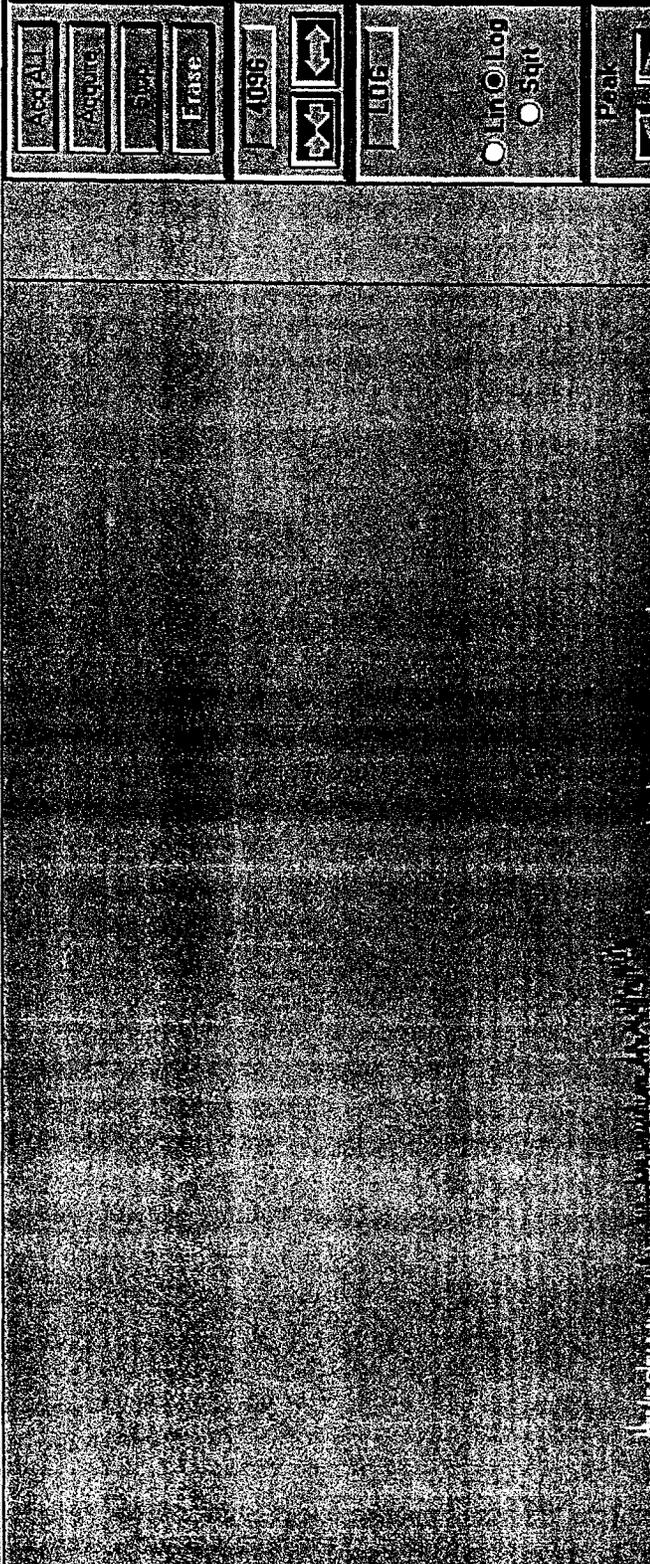
ANALYSIS REVIEWED BY: Gayle Haas

APPROVED BY: CJ Bianconi 4/24/00

Library: **DAS_STD.MDB**

Am241

135 Counts 00000460.DXS



0 4095

00A1148-019.001

System Date: 09:May-2000 14:49:45

Channel: 1816 Elapsed/Real time: 12297.01 / 12297.00 Dead time: 0.0

Energy: 5105.8 Counts: 1 ROI: 740

FWHM: 379

APRAL

APRAL

APRAL

Erase

4096

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EOS

Lim/Log

Sqr

Peak

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Print

Files

Logoff

Display

Info

Quit/Exit

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 13:13:21

Sample ID: 00A1148-020.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 24, 2000 09:31:54
Analysis Date: April 24, 2000 13:12:30
Procedure: polonium210 samples
Device: Oasis:02:01
Analysis Method: ROI Analysis
Spectrum File: 00000301.OXS LiveTime: 10,800.00

Calibrations:

Energy = $2.127E+02 + 2.333E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: March 14, 2000 09:19:39 Std: 2:1 energy cal
Shape not Calibrated.
Efficiency = $3.393E-01 \pm 4.339E-03$
Calibration Date: August 11, 1999 13:14:16 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5814.6	1.2
2	Po214	7420.0	7770.1	7594.8	2.3
3	Po212	8521.5	8850.6	8684.3	1.2
4	Po210	2263.7	5402.1	5107.6	3.5

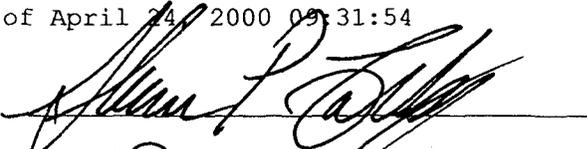
ROI ANALYSIS RESULTS

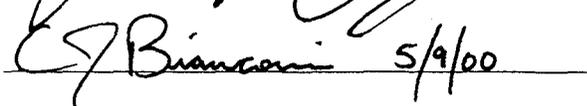
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-0.8 ± 0.2	0.76	$-4.23E-03 \pm 1.27E-03$	Unknown
Po214	0.9 ± 1.0	0.07	$5.17E-03 \pm 5.57E-03$	Unknown
Po212	-0.1 ± 0.1	0.14	$-7.69E-04 \pm 5.43E-04$	Unknown
Po210	544.7 ± 23.6	13.35	3.026 ± 0.131	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	$-1.25E-02 \pm 3.76E-03$	$9.29E-02$
Po214	Po214	1.000	0.015 ± 0.016	$5.90E-02$
Po212	Po212	1.000	$-2.27E-03 \pm 1.60E-03$	$6.50E-02$
Po210	Po210	1.000	8.918 ± 0.404	$2.48E-01$

Activity reported as of April 24, 2000 09:31:54

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

559

Sample ID: 00A1148-021.001 Type: Unknown

Batch ID: unknowns
Acquisition Start: May 03, 2000 16:40:24
Analysis Date: May 04, 2000 09:10:00
Procedure: Po210 count
Device: Oasis:01:01
Analysis Method: ROI Analysis
Spectrum File: 00000533.OXS LiveTime: 51,200.00

Calibrations:
Energy = 3.865E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 03, 2000 17:45:10 Std: 1:1 energy cal
Shape not Calibrated.
Efficiency = 3.041E-01 ± 4.004E-03
Calibration Date: April 07, 2000 09:49:29 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1	Po218	5550.0	6104.5	6046.5	3.5
2	Po214	6588.5	7874.7	7676.1	4.2
3	Po212	8393.8	8808.6	8772.8	11.2
4	Po210	2180.3	5343.3	5228.9	6.2

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	47.6 ± 7.3	2.37	0.056 ± 8.52E-03	Unknown
Po214	30.8 ± 5.8	1.19	0.036 ± 6.77E-03	Unknown
Po212	47.3 ± 7.6	4.74	0.055 ± 8.90E-03	Unknown
Po210	2,565.6 ± 51.4	34.37	3.007 ± 0.060	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.184 ± 0.028	3.93E-02
Po214	Po214	1.000	0.119 ± 0.022	3.08E-02
Po212	Po212	1.000	0.182 ± 0.029	5.12E-02
Po210	Po210	1.000	9.888 ± 0.237	1.20E-01

Activity reported as of May 03, 2000 16:40:24

ANALYSIS REVIEWED BY: [Signature]

APPROVED BY: CJ Branconi 5/9/00

*Spike activity:
@ 22.892 dpm*

5/6/00

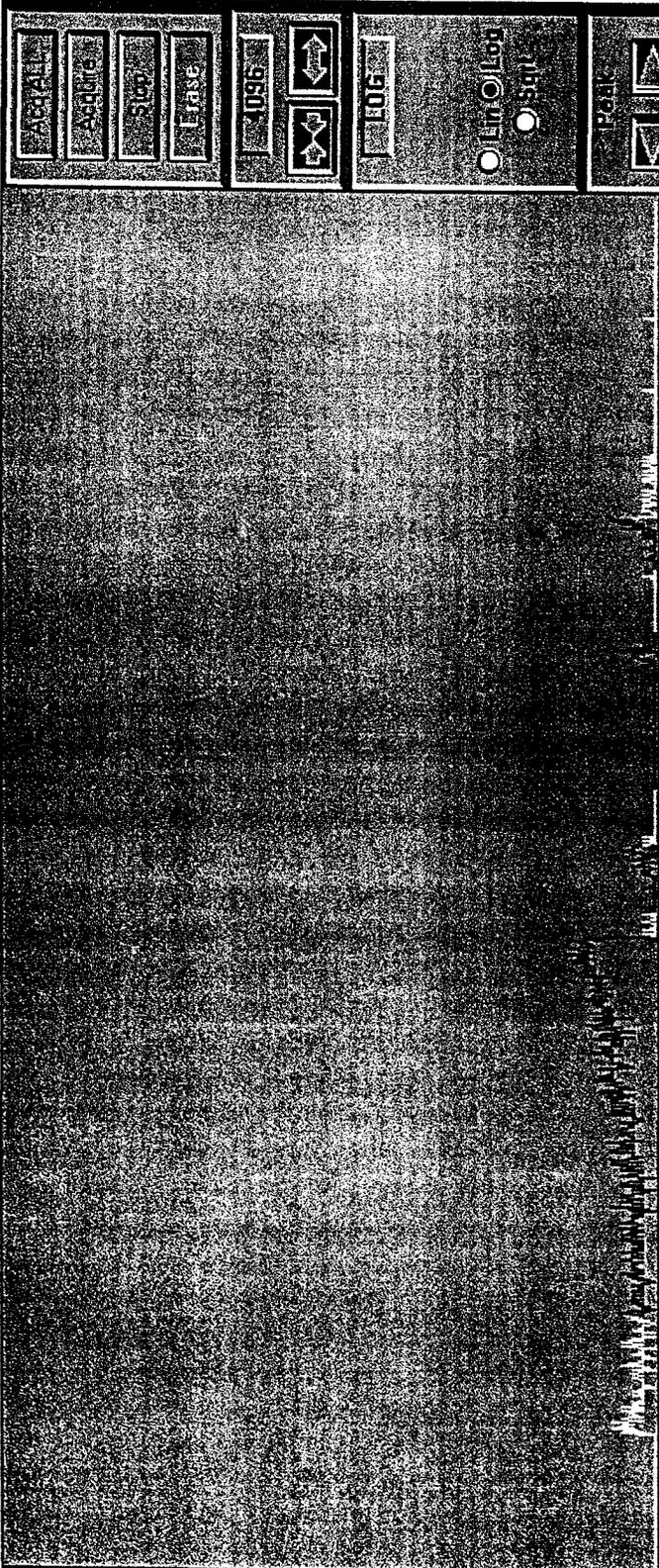
OASIS - MCA

File Edit View Acq/Param Job Report Close Help

Library

Am241

DAS_STD.MDB



4095

00A1148-021.001

System Date
04 May 2000 10:04:58

Channel: 1434 Elapsed Real Time: 51201.00 Elapsed Live Time: 51200.00 Dead Time: 0.0

Message Window

Acquire

Pause

Stop

Erase

4096

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LOG

Lin Log

Sqr

Peak

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Print

Print

Control

Display

Info

Quit

Energy: 4039.9 Counts: 2 ROI: Integral: 2,600 Peak: 5,228.88 FWHM: 6.22

562

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 13:12:23

Sample ID: 00A1148-022.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 24, 2000 09:31:55
Analysis Date: April 24, 2000 13:12:16
Procedure: polonium210 samples
Device: Oasis:02:02
Analysis Method: ROI Analysis
Spectrum File: 00000302.OXS LiveTime: 10,800.00

Calibrations:

Energy = 1.436E+01 +2.491E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:25:18 Std: 2:2 energy calibration
Shape not Calibrated.
Efficiency = 3.436E-01 ± 4.641E-03
Calibration Date: April 05, 2000 09:05:57 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5814.5	1.2
2	Po214	7420.0	7770.1	7593.4	1.2
3	Po212	8521.5	8850.6	8687.1	1.2
4	Po210	2263.7	5402.1	3831.3	2.5

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-1.5 ± 0.6	1.50	-8.33E-03 ± 3.40E-03	Unknown
Po214	-0.8 ± 0.4	0.75	-4.17E-03 ± 2.41E-03	Unknown
Po212	0.0 ± 0.0	0.00	0.00E+00 ± 0.00E+00	Unknown
Po210	8.0 ± 4.8	12.00	0.044 ± 0.027	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-2.43E-02 ± 9.91E-03	1.17E-01
Po214	Po214	1.000	-1.21E-02 ± 7.00E-03	9.53E-02
Po212	Po212	1.000	0.00E+00 ± 0.00E+00	4.38E-02
Po210	Po210	1.000	0.129 ± 0.078	2.50E-01

Activity reported as of April 24, 2000 09:31:55

ANALYSIS REVIEWED BY: *Man Berry*

APPROVED BY: *CJ Brannon 5/9/00*

513

DASIP MCA
 File Edit View AcqParams Lock Reports Help
 Library: DAS_STD.MDB Am241
 5-Static: 00000302.DXS
 AcqALL AcqOFF Stop Erase
 LOG
 LOG
 Peak
 0 4095
 Spectrum ID
 00A1148-022.001
 System Date
 10-May-2000 06:44:09
 Channel: 1322
 Elapsed Real Time: 10800.07
 Elapsed Live Time: 10800.00
 Dead Time: 0.0
 Energy: 3308.7
 Counts: 0
 ROI:
 Integral: 20
 Peak: 3,831.28
 FWHM: 2.49
 Message Window
 564

564

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 13:12:07

Sample ID: 00A1148-023.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 24, 2000 09:31:57
Analysis Date: April 24, 2000 13:11:59
Procedure: polonium210 samples
Device: Oasis:02:03
Analysis Method: ROI Analysis
Spectrum File: 00000303.OXS LiveTime: 10,800.00

Calibrations:

Energy = $1.604E+02 + 2.389E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:34:53 Std: 2:3 energy cal
Shape not Calibrated.
Efficiency = $3.357E-01 \pm 4.547E-03$
Calibration Date: April 05, 2000 09:20:34 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount:

Aliquot Amount: 1.000 \pm 0.000 samp
1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1 Po218	Po218	5552.6	6077.8	5815.3	2.4
2 Po214	Po214	7420.0	7770.1	7595.1	2.4
3 Po212		8521.5	8850.6	8686.9	1.2
4 Po210	Po210	2263.7	5402.1	3832.4	2.4

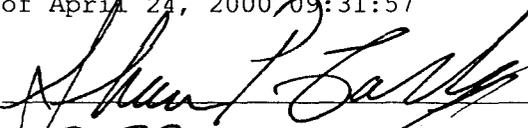
ROI ANALYSIS RESULTS

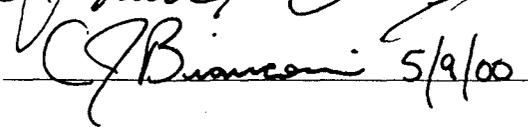
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	1.2 \pm 1.4	0.83	$6.50E-03 \pm 7.97E-03$	Unknown
Po214	0.9 \pm 1.0	0.14	$4.79E-03 \pm 5.58E-03$	Unknown
Po212	-0.3 \pm 0.1	0.28	$-1.54E-03 \pm 7.69E-04$	Unknown
Po210	57.8 \pm 8.5	14.18	0.321 ± 0.047	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.019 ± 0.024	$9.61E-02$
Po214	Po214	1.000	0.014 ± 0.017	$6.57E-02$
Po212		1.000	$-4.58E-03 \pm 2.29E-03$	$7.44E-02$
Po210	Po210	1.000	0.957 ± 0.142	$2.57E-01$

Activity reported as of April 24, 2000 09:31:57

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

OASIS MCA
 File Edit View Acq Params Tools Reports Tables Help
 DAS STD.MDB Lib: DAS STD.MDB Nuclide: Am241 5: Static: 00000303.DXS
 4095
 Acquire Stop Edit 4095 LOG Lin Log Sort Peak
 Plot Parameters Controls Display Info Save Display
 00A1148-023.001
 Spectrum ID
 System Date: 10-May-2000 06:34:23
 Message Window
 Channel: 1081 Elapsed Real Time: 10800.06 Elapsed Live Time: 10800.00 Dead Time: 0.0
 Energy: 2743.7 Counts: 0 ROI: Integral: 72 Peak: 3.832.38 FWHM: 2.39

8-45

Stop

Sample ID: 00A1148-024.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: May 03, 2000 08:48:51
 Analysis Date: May 03, 2000 16:49:15
 Procedure: Po210 count
 Device: Oasis:01:03
 Analysis Method: ROI Analysis
 Spectrum File: 00000528.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = 6.596E+01 +2.779E+00 * Chn **Coeff. of Correlation:** -0.998
 Calibration Date: April 24, 2000 13:03:27 **Std:** 1:3 Energy Cal
 Shape not Calibrated.
 Efficiency = 3.120E-01 ± 4.098E-03
 Calibration Date: April 24, 2000 10:05:48 **Std:** TS4189

External Recovery No Ext.Recovery

Air Filter Analysis Parameters:
 Sample Type: Unknown
 Air Filter Time on: May 03, 2000 08:47:18
 Air Filter Time off: May 03, 2000 08:47:18
 Total Collect Time: 0.000 hours
 Air Volume: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5827.5	4.2
2 Po214	Po214	6588.5	7874.7	7231.0	2.8
3 Po212	Po212	8393.8	8808.6	8745.7	3.2
4 Po210	Po210	2180.3	5343.3	5163.2	3.1

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	12.7 ± 3.9	1.33	0.026 ± 8.04E-03	Unknown
Po214	0.3 ± 2.2	2.67	6.94E-04 ± 4.55E-03	Unknown
Po212	18.0 ± 4.2	0.00	0.038 ± 8.84E-03	Unknown
Po210	489.0 ± 22.8	18.00	1.019 ± 0.047	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm/samp)
Po218	Po218	1.000	0.085 ± 0.026	5.08E-02
Po214	Po214	1.000	2.23E-03 ± 0.015	6.44E-02
Po212	Po212	1.000	0.120 ± 0.028	1.81E-02
Po210	Po210	1.000	3.265 ± 0.158	1.38E-01

Activity reported as of May 03, 2000 08:48:51

ANALYSIS REVIEWED BY: *Alan P. Lally*

APPROVED BY: *C. J. Bianconi 5/9/00*

8
Po 210

OASIS - MCA

File Edit View Acq Params Tools Reports Close Help

Library: OAS_STD.MDB Am241

Acq ALL Acquire Stop

4095

LOG

OLM Log Split

Peak

Pretets ROI Controls DISPLAY INFO AUX DISP

0 4095

Spectrum ID

00A1148-024.001

System Date
03-May-2000 16:52:24

Channel: 1687 Elapsed Real Time: 28600.72 Elapsed Live Time: 28800.00 Dead Time: 0.0

Energy: 4753.5 Counts: 3 ROI: 507 Integral: 5.163.20 Peak: 5.163.20 FWHM: 3.13

Message Window

8-47

5168

Oasis Device # 2

RFETS; Golden, CO

Apr 24, 2000 13:11:44

Sample ID: 00A1148-025.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 24, 2000 09:31:58
Analysis Date: April 24, 2000 13:09:01
Procedure: polonium210 samples
Device: Oasis:02:04
Analysis Method: ROI Analysis
Spectrum File: 00000304.OXS LiveTime: 10,800.00

Calibrations:

Energy = $1.412E+02 + 2.389E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: April 05, 2000 09:30:14 Std: AS 4188
Shape not Calibrated.
Efficiency = $3.398E-01 \pm 4.596E-03$
Calibration Date: April 05, 2000 09:40:39 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount:

1.000 \pm 0.000 samp

Aliquot Amount:

1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS START	EXTENTS END	PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5815.3	1.2
2	Po214	7420.0	7770.1	7595.2	2.4
3	Po212	8521.5	8850.6	8684.6	1.2
4	Po210	2263.7	5402.1	5251.5	9.1

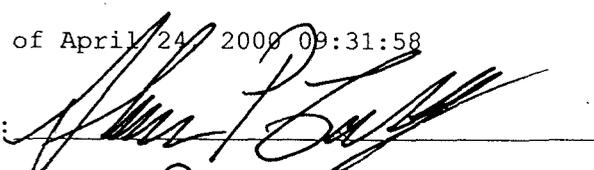
ROI ANALYSIS RESULTS

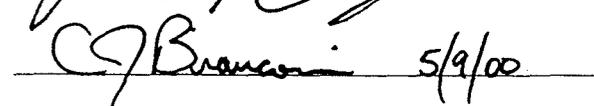
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-0.7 \pm 0.2	0.69	-3.84E-03 \pm 1.22E-03	Unknown
Po214	1.8 \pm 1.4	0.21	9.96E-03 \pm 7.88E-03	Unknown
Po212	-0.2 \pm 0.1	0.21	-1.15E-03 \pm 6.66E-04	Unknown
Po210	463.7 \pm 21.9	13.35	2.576 \pm 0.121	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-1.13E-02 \pm 3.58E-03	9.05E-02
Po214	Po214	1.000	0.029 \pm 0.023	6.96E-02
Po212		1.000	-3.39E-03 \pm 1.96E-03	6.96E-02
Po210	Po210	1.000	7.580 \pm 0.372	2.47E-01

Activity reported as of April 24, 2000 09:31:58

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

OASIS - MCA

File Edit View Acq Params Tools Reports Close Help

Library: Am241

OAS_STD.MDB

5: Static: 00000304.DXS

Acq ALL Acquire Stop LOG

4095

LOG

Lin Log Sqrt

Peak

Print FDI CONTROL Display Info Acq DISP

0

4095

Spectrum ID

00A1148-025.001

System Date

10-May-2000 06:47:47

Channel: 1205 Elapsed Real Time: 10800.10 Elapsed Live Time: 10800.00 Dead Time: 0.0

Energy: 3019.4 Counts: 0 ROI: Integral: 477 Peak: 5,251.48 FWHM: 9.08

Sample ID: 00A1148-026.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 06:50:47
 Analysis Date: April 26, 2000 09:51:07
 Procedure: Po210 count
 Device: Oasis:01:03
 Analysis Method: ROI Analysis
 Spectrum File: 00000494.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = $6.596E+01 + 2.779E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
 Calibration Date: April 24, 2000 13:03:27 **Std:** 1:3 Energy Cal
 Shape not Calibrated.
 Efficiency = $3.120E-01 \pm 4.098E-03$
 Calibration Date: April 24, 2000 10:05:48 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5827.5	2.8
2 Po214	Po214	6588.5	7874.7	7231.0	1.4
3 Po212	Po212	8393.8	8808.6	8601.2	1.4
4 Po210	Po210	2180.3	5343.3	5135.4	6.0

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.7 ± 1.0	0.26	4.13E-03 ± 5.74E-03	Unknown
Po214	-0.3 ± 0.3	0.26	-1.42E-03 ± 1.42E-03	Unknown
Po212	-0.5 ± 0.4	0.51	-2.85E-03 ± 2.01E-03	Unknown
Po210	567.8 ± 24.0	7.17	3.155 ± 0.133	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.013 ± 0.018	8.14E-02
Po214	Po214	1.000	-4.56E-03 ± 4.56E-03	8.14E-02
Po212	Po212	1.000	-9.13E-03 ± 6.45E-03	9.52E-02
Po210	Po210	1.000	10.111 ± 0.448	2.24E-01

Activity reported as of April 26, 2000 06:50:47

ANALYSIS REVIEWED BY: *[Signature]*

APPROVED BY: *[Signature]* 5/9/00

571

OASIS - MCA

File Edit View Acq Params Tools Reports Close Help

Library: **QAS_STD.MDB** Nuclide: **Am241** 5:Static: 00000494.OXS

4095

Acquire Stop Erase

4095

Limit Log Sort

Peak

Print Refresh Control Display Info Full Display

0

4095

00A1148-026.001

System Date: 26-Apr-2000 13:05:42

Elapsed Real Time: 10800.10 Elapsed Live Time: 10800.00 Dead Time: 0.0

Channel: 18

Energy: 115.0 Counts: 0 ROI: Integral: Peak:

FWHM:

515

Sample ID: 00A1148-027.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 06:48:31
 Analysis Date: April 26, 2000 09:48:49
 Procedure: Po210 count
 Device: Oasis:01:02
 Analysis Method: ROI Analysis
 Spectrum File: 00000493.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 5.823E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 07, 2000 14:55:56 Std: 1:2 energy cal
 Shape not Calibrated.
 Efficiency = 3.089E-01 ± 4.062E-03
 Calibration Date: April 07, 2000 15:15:30 Std: TS4189

External Recovery No Ext.Recovery
 Original Sample Amount: 1.000 ± 0.000 samp
 Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	2.8
4 Po210	Po210	2180.3	5343.3	5100.5	4.6

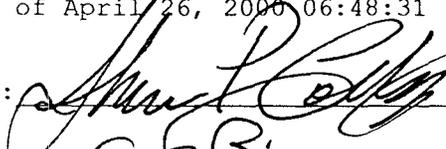
ROI ANALYSIS RESULTS

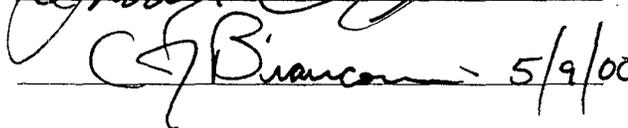
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	2.0 ± 1.4	0.00	0.011 ± 7.86E-03	Unknown
Po214	0.7 ± 1.0	0.26	4.13E-03 ± 5.74E-03	Unknown
Po212	3.0 ± 1.7	0.00	0.017 ± 9.62E-03	Unknown
Po210	578.4 ± 24.2	4.62	3.213 ± 0.134	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.036 ± 0.025	4.87E-02
Po214	Po214	1.000	0.013 ± 0.019	8.23E-02
Po212	Po212	1.000	0.054 ± 0.031	4.87E-02
Po210	Po210	1.000	10.401 ± 0.456	1.91E-01

Activity reported as of April 26, 2000 06:48:31

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

OASIS - MCA [X]

File Edit View AcqParams Lock Report Help

Library: OAS_STD.MDB Nucleide: Am241

5-Static: 00000493.OXS

4095

LOG

Log Log

Lin Log Sqrt

PARK

Presets ROI Controls Display Info AutoDisc

0

4095

Spectrum ID

00A1148-027.001

System Date

26-Apr-2000 13:09:12

Channel: 2850

Elapsed Real Time: 10800:10

Elapsed Live Time: 10800:00

Dead Time: 0:0

Energy: 8011.4

Counts: 0

ROI: ROI:

Integrals: Peak:

FWHM:

574

Sample ID: 051000.028.0915 Type: Unknown

Batch ID: unknowns
Acquisition Start: May 10, 2000 09:15:36
Analysis Date: May 10, 2000 13:43:17
Procedure: RFETS unknown
Device: Oasis:01:01
Analysis Method: ROI Analysis
Spectrum File: 00000558.OXS LiveTime: 10,800.00

Calibrations:
Energy = 3.865E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 03, 2000 17:45:10 Std: 1:1 energy cal
Shape not Calibrated.
Efficiency = 3.041E-01 ± 4.004E-03
Calibration Date: April 07, 2000 09:49:29 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Pu239	Po210	2437.5	5342.1	5293.1	2.8
2 Po218	Po218	5550.0	6104.5	5826.0	1.4
3 Po214	Po214	6588.5	7874.7	7229.6	2.8
4 Po212	Po212	8393.8	8808.6	8599.7	1.4

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Pu239	33.8 ± 6.3	5.25	0.188 ± 0.035	Unknown
Po218	-0.8 ± 0.4	0.75	-4.17E-03 ± 2.41E-03	Unknown
Po214	0.5 ± 1.1	0.50	2.78E-03 ± 5.89E-03	Unknown
Po212	0.0 ± 0.0	0.00	0.00E+00 ± 0.00E+00	Unknown

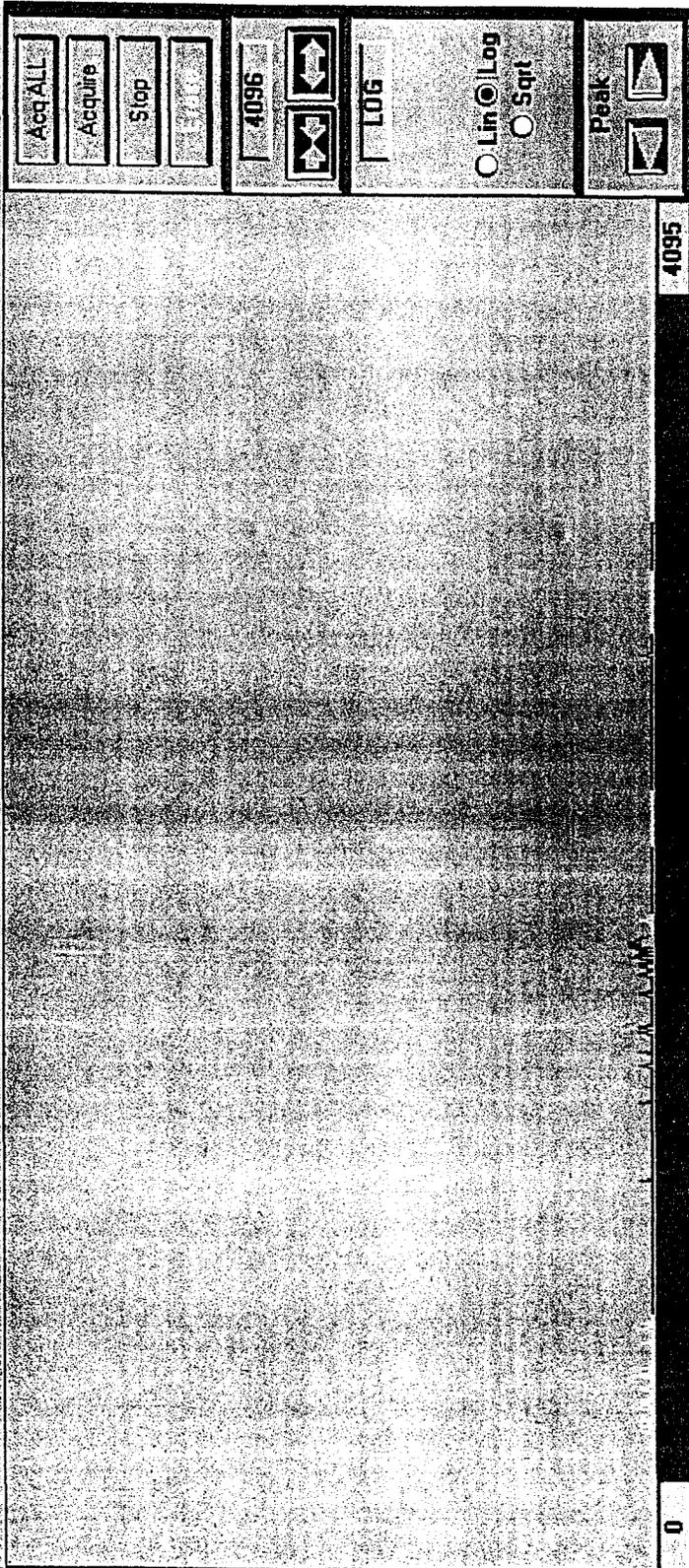
NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Pu239	Po210	1.000	0.617 ± 0.116	2.03E-01
Po218	Po218	1.000	-1.37E-02 ± 7.91E-03	1.08E-01
Po214	Po214	1.000	9.14E-03 ± 0.019	9.70E-02
Po212	Po212	1.000	0.00E+00 ± 0.00E+00	4.94E-02

Activity reported as of May 10, 2000 09:15:36

ANALYSIS REVIEWED BY: Thorvaldson

APPROVED BY: CJ Brancom 5/10/00



0

4095

Spectrum ID
051000.028.0915

System Date
10-May-2000 13:38:10

Message Window

Channel: 999 Elapsed Real Time: 10807.00 Elapsed Live Time: 10800.00 Dead Time: 0.0

Acq ALL
Acquire
Stop

4096

LOG

Lin Log Sqrt

Peak

Presets
ROIs
Controls
Display
Info
Aux Disp

576

Sample ID: 00A1148-029.001 Type: Unknown

Batch ID: unknowns
Acquisition Start: April 26, 2000 15:40:12
Analysis Date: April 27, 2000 06:47:16
Procedure: Po210 count
Device: Oasis:01:03
Analysis Method: ROI Analysis
Spectrum File: 00000509.OXS LiveTime: 28,800.00

Calibrations:
Energy = 6.596E+01 +2.779E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 24, 2000 13:03:27 Std: 1:3 Energy Cal
Shape not Calibrated.
Efficiency = 3.120E-01 ± 4.098E-03
Calibration Date: April 24, 2000 10:05:48 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1	Po218	5550.0	6104.5	5827.5	2.8
2	Po214	6588.5	7874.7	7231.0	2.8
3	Po212	8393.8	8808.6	8601.2	1.4
4	Po210	2180.3	5343.3	5282.7	21.7

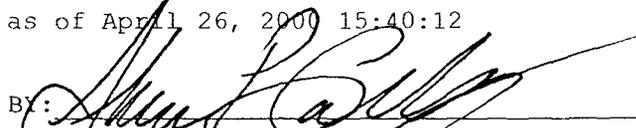
ROI ANALYSIS RESULTS

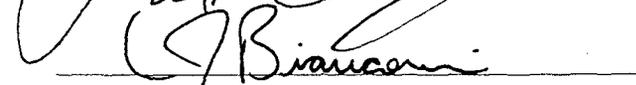
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	1.3 ± 1.6	0.68	2.74E-03 ± 3.27E-03	Unknown
Po214	1.3 ± 1.6	0.68	2.74E-03 ± 3.27E-03	Unknown
Po212	-1.4 ± 1.0	1.37	-2.85E-03 ± 2.01E-03	Unknown
Po210	429.9 ± 21.5	19.13	0.896 ± 0.045	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	8.79E-03 ± 0.010	4.16E-02
Po214	Po214	1.000	8.79E-03 ± 0.010	4.16E-02
Po212	Po212	1.000	-9.13E-03 ± 6.45E-03	5.14E-02
Po210	Po210	1.000	2.870 ± 0.148	1.43E-01

Activity reported as of April 26, 2000 15:40:12

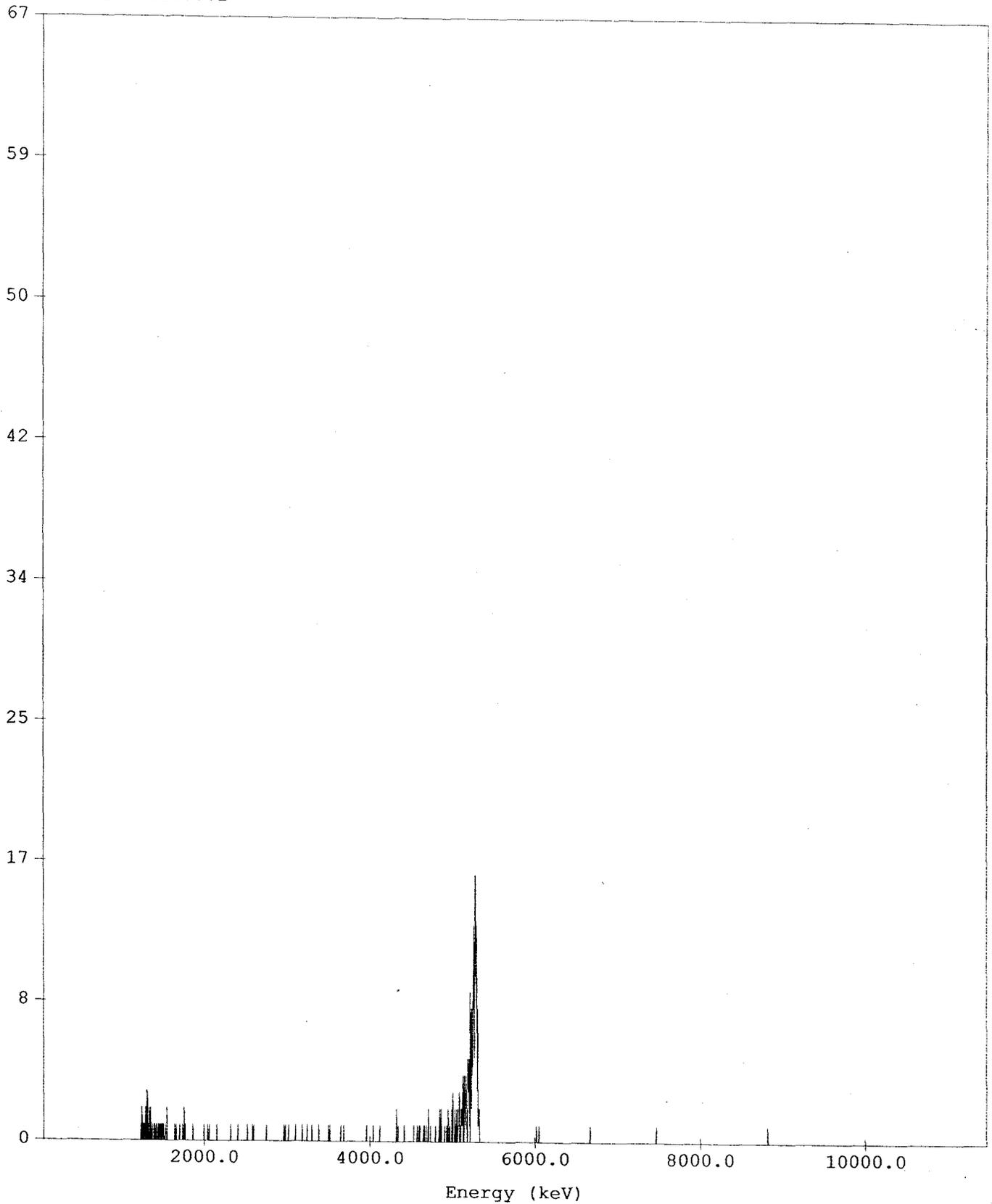
ANALYSIS REVIEWED BY: 

APPROVED BY: 

Spike value:
22,980 dpm
Pu 239

577

File(3): 00000509.OXS Date: 26-Apr-2000 15:40:12 LT: 28,840.61 RT: 28,840.62
D(3): 00A1148-029.001



578

8-57

Sample ID: 00A1148-030.001 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: April 26, 2000 14:27:25
Analysis Date: April 27, 2000 06:47:13
Procedure: Po210 count
Device: Oasis:01:01
Analysis Method: ROI Analysis
Spectrum File: 00000508.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $3.865E+01 + 2.790E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
Calibration Date: April 03, 2000 17:45:10 **Std:** 1:1 energy cal
 Shape not Calibrated.
Efficiency = $3.041E-01 \pm 4.004E-03$
Calibration Date: April 07, 2000 09:49:29 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	2.8
4 Po210	Po210	2180.3	5343.3	5304.2	9.5

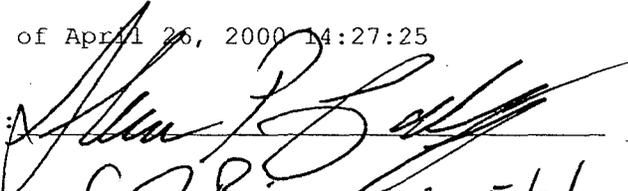
ROI ANALYSIS RESULTS

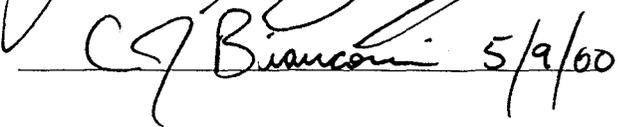
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	3.3 ± 2.1	0.69	$6.90E-03 \pm 4.40E-03$	Unknown
Po214	0.6 ± 1.7	1.37	$1.31E-03 \pm 3.57E-03$	Unknown
Po212	1.0 ± 1.0	0.00	$2.08E-03 \pm 2.08E-03$	Unknown
Po210	449.2 ± 21.9	17.83	0.936 ± 0.046	Unknown

NUCLIDE ANALYSIS RESULTS

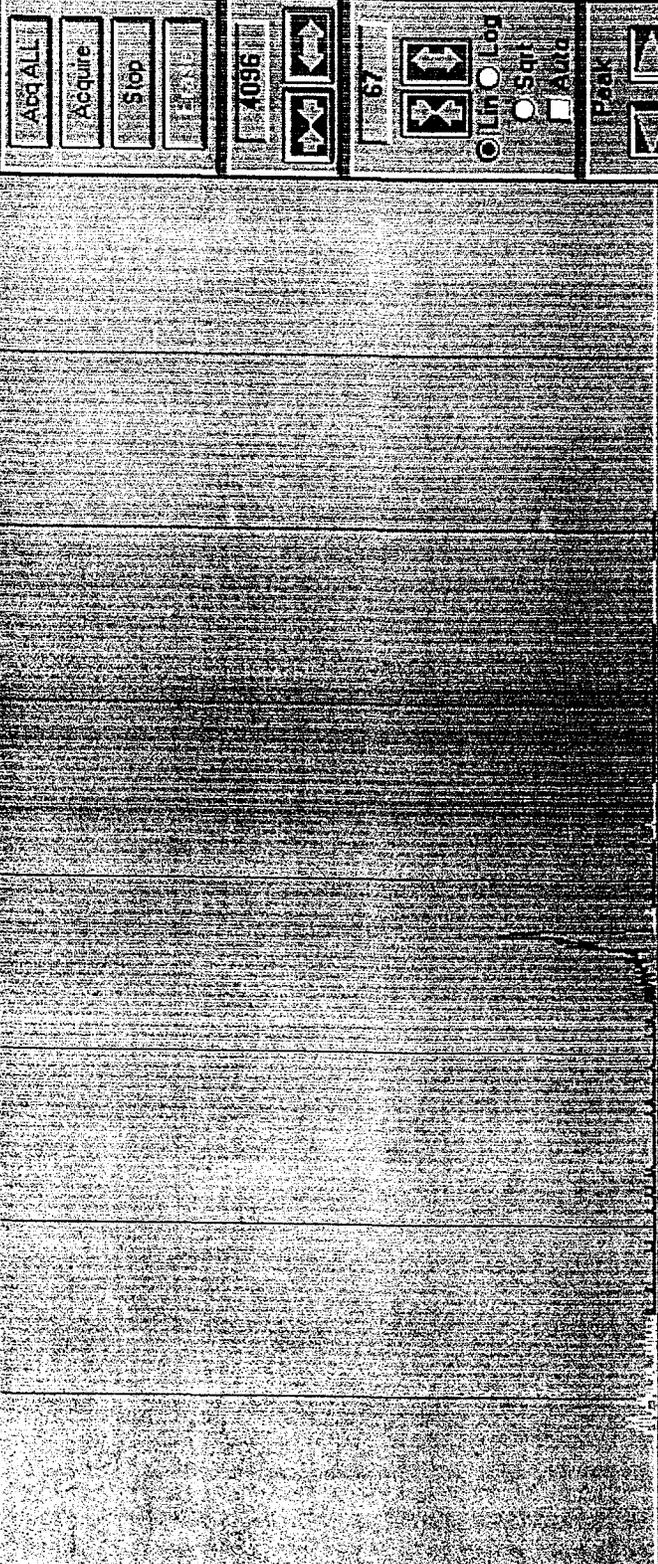
ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.023 ± 0.014	4.28E-02
Po214	Po214	1.000	$4.31E-03 \pm 0.012$	5.28E-02
Po212	Po212	1.000	$6.85E-03 \pm 6.85E-03$	1.85E-02
Po210	Po210	1.000	3.078 ± 0.155	1.42E-01

Activity reported as of April 26, 2000 14:27:25

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

spike activity:
 22.892 dpm
 Pu 239



0

Spectrum ID: 00A1148-030.001

System Date: 27 Apr 2000 07:02:36

Channel: 1028

Elapsed Real Time: 28800.12

Elapsed Time: 28800.00

Dead Time: 0.0

Energy: 2908.4

Counts: 0

ROI: [redacted]

Integral: 467

Peak: 5304.23

FWHM: 9.53

Acq ALL

Acquire

Stop

4095

67

Log

Quit

Auto

Peak

Reset

ROI

Control

Display

Info

Save/Load

Sample ID: 051000.031.0920 **Type:** Unknown
Batch ID: unknowns
Acquisition Start: May 10, 2000 09:17:44
Analysis Date: May 10, 2000 13:48:31
Procedure: RFETS unknown
Device: Oasis:01:02
Analysis Method: ROI Analysis
Spectrum File: 00000559.OXS **LiveTime:** 10,800.00

Calibrations:

Energy = 5.823E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 07, 2000 14:55:56 Std: 1:2 energy cal
 Shape not Calibrated.
 Efficiency = 3.089E-01 ± 4.062E-03
 Calibration Date: April 07, 2000 15:15:30 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Pu239	Po210	2437.5	5311.4	4534.1	6.5
2 Po218	Po218	5550.0	6104.5	5826.0	1.4
3 Po214	Po214	6588.5	7874.7	7229.6	2.8
4 Po212	Po212	8393.8	8808.6	8599.7	1.4

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Pu239	574.5 ± 24.1	6.50	3.192 ± 0.134	Unknown
Po218	0.0 ± 0.0	0.00	0.00E+00 ± 0.00E+00	Unknown
Po214	1.8 ± 1.4	0.25	9.72E-03 ± 7.98E-03	Unknown
Po212	-0.3 ± 0.3	0.25	-1.39E-03 ± 1.39E-03	Unknown

NUCLIDE ANALYSIS RESULTS

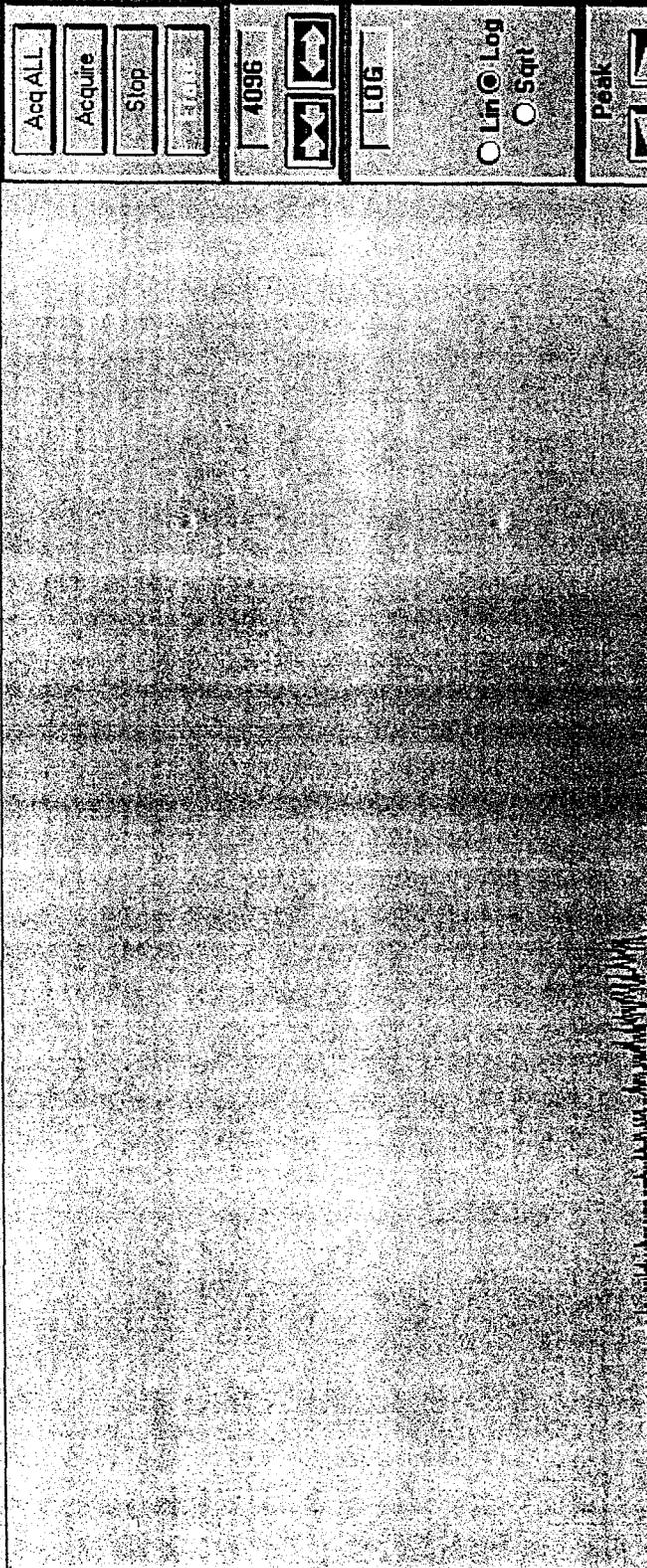
ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Pu239	Po210	1.000	10.331 ± 0.455	2.17E-01
Po218	Po218	1.000	0.00E+00 ± 0.00E+00	4.87E-02
Po214	Po214	1.000	0.031 ± 0.026	8.17E-02
Po212	Po212	1.000	-4.50E-03 ± 4.50E-03	8.17E-02

Activity reported as of May 10, 2000 09:17:44

ANALYSIS REVIEWED BY: Thornalds

APPROVED BY: CJ Bianconi 5/10/00

Library: **DAS_STD.MDB** Nuclide: **Am241**



Acq ALL Acquire Stop

4096 LOG

Lin Log Sqrt

Peak

0 4095

ROI Editor

ROI Type: **Unknown**

Associated Nuclide: **Po218**

Start: **5550.07** End: **6104.52** keV/Ch: **2.79**

Energy: **7076.7** Counts: **0** RDI: **0** Integral: **2** Peak: **7,229.62** FWHM: **2.79**

Clear ALL ROI's Save ROI's

Energy Delta: **0.0** Enable

Clear Edit Erase

ROI ID: **Po218**

Presets ROI Controls Display Info Acq Disp

Sample ID: 00A1148-032.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 06:59:10
 Analysis Date: April 26, 2000 09:59:26
 Procedure: Po210 count
 Device: Oasis:01:04
 Analysis Method: ROI Analysis
 Spectrum File: 00000495.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 8.600E+01 +2.746E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 12, 2000 10:28:56 Std: 1:4 energy cal
 Shape not Calibrated.
 Efficiency = 3.084E-01 ± 4.055E-03
 Calibration Date: April 12, 2000 11:45:10 Std: TS4189

External Recovery No Ext.Recovery
 Original Sample Amount: 1.000 ± 0.000 samp
 Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.2	1.4
2 Po214	Po214	6588.5	7874.7	7232.4	2.7
3 Po212	Po212	8393.8	8808.6	8600.1	2.7
4 Po210	Po210	2180.3	5343.3	4661.7	3.4

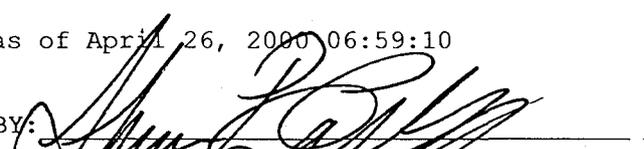
ROI ANALYSIS RESULTS

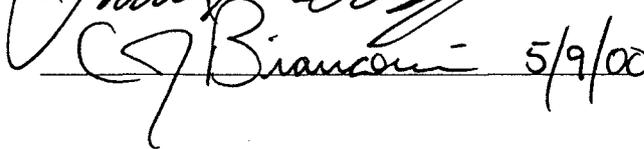
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	-0.8 ± 0.4	0.76	-4.25E-03 ± 2.45E-03	Unknown
Po214	0.7 ± 1.0	0.25	4.14E-03 ± 5.73E-03	Unknown
Po212	0.5 ± 1.1	0.51	2.73E-03 ± 5.91E-03	Unknown
Po210	183.7 ± 13.8	4.33	1.020 ± 0.076	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-1.38E-02 ± 7.95E-03	1.07E-01
Po214	Po214	1.000	0.013 ± 0.019	8.23E-02
Po212	Po212	1.000	8.84E-03 ± 0.019	9.61E-02
Po210	Po210	1.000	3.309 ± 0.252	1.87E-01

Activity reported as of April 26, 2000 06:59:10

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

OASIS - MCA

File Edit View Acq Params Tools Reports Close Help

Library: **DAS_STD.MDB** Nuclide: **Am241** 5:Static: **00000495.OXS**

APPLY ACQUIRE STOP ERASE

4096

LINE LOG SQR

PEAK

00A1148-032.001

System Date: 26-Apr-2000 10:29:50

Channel: 1140 Elapsed Real Time: 10800.19 Elapsed Live Time: 10800.00 Dead Time: 0.0

Energy: 3217.2 Counts: 0 ROI: [] Integral: 188 Peak: 4.65166 FWHM: 3.43

584

Sample ID: 00A1148-033.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 14:11:48
 Analysis Date: April 27, 2000 06:47:15
 Procedure: Po210 count
 Device: Oasis:01:02
 Analysis Method: ROI Analysis
 Spectrum File: 00000506.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = 5.823E+01 +2.790E+00 * Chn Coeff. of Correlation: -0.998
 Calibration Date: April 07, 2000 14:55:56 Std: 1:2 energy cal
 Shape not Calibrated.
 Efficiency = 3.089E-01 ± 4.062E-03
 Calibration Date: April 07, 2000 15:15:30 Std: TS4189

External Recovery No Ext.Recovery
 Original Sample Amount: 1.000 ± 0.000 samp
 Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	2.8
4 Po210	Po210	2180.3	5343.3	4933.1	3.9

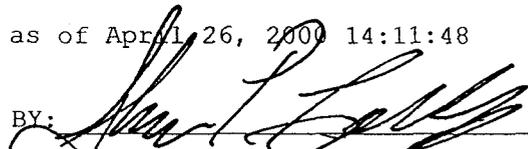
ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	16.0 ± 4.0	0.00	0.033 ± 8.33E-03	Unknown
Po214	10.3 ± 3.4	0.68	0.021 ± 7.06E-03	Unknown
Po212	12.0 ± 3.5	0.00	0.025 ± 7.22E-03	Unknown
Po210	898.7 ± 30.3	12.31	1.872 ± 0.063	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.108 ± 0.027	1.82E-02
Po214	Po214	1.000	0.070 ± 0.023	4.21E-02
Po212	Po212	1.000	0.081 ± 0.023	1.82E-02
Po210	Po210	1.000	6.060 ± 0.219	1.19E-01

Activity reported as of April 26, 2000 14:11:48

ANALYSIS REVIEWED BY: 

APPROVED BY: 

Library: OAS_STD.MDB Am241

Acquire Stop

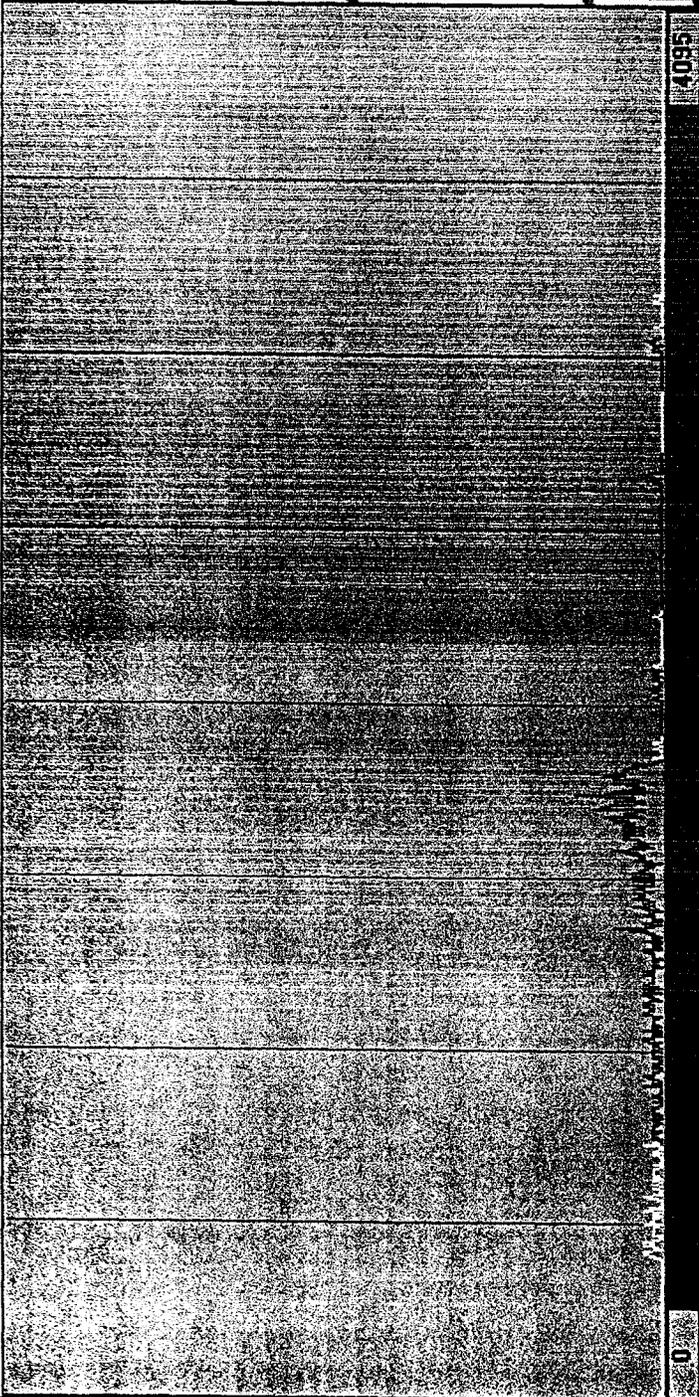
4096

4095

Lim Log Start Auto

Peak

ROI Controll Display Info PAW/DTHD



00A1148-033.001

System Date: 27 Apr 2000 06:57:31

Channel: 488 Elapsed Real Time: 28600.50

Energy: 1419.3 Counts: 0 ROI: 0

Message Window

28600.00 Dead Time: 0.0

Sample ID: 00A1148-034.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 14:23:29
 Analysis Date: April 27, 2000 06:47:18
 Procedure: Po210 count
 Device: Oasis:01:04
 Analysis Method: ROI Analysis
 Spectrum File: 00000507.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $8.600E+01 + 2.746E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
 Calibration Date: April 12, 2000 10:28:56 **Std:** 1:4 energy cal
 Shape not Calibrated.
 Efficiency = $3.084E-01 \pm 4.055E-03$
 Calibration Date: April 12, 2000 11:45:10 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 \pm 0.000 samp
Aliquot Amount: 1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.2	2.7
2 Po214	Po214	6588.5	7874.7	7232.4	1.4
3 Po212	Po212	8393.8	8808.6	8600.1	1.4
4 Po210	Po210	2180.3	5343.3	5246.7	113.3

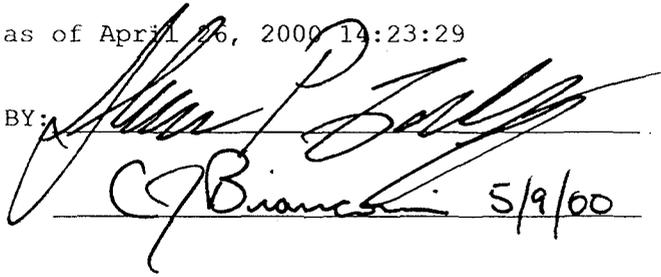
ROI ANALYSIS RESULTS

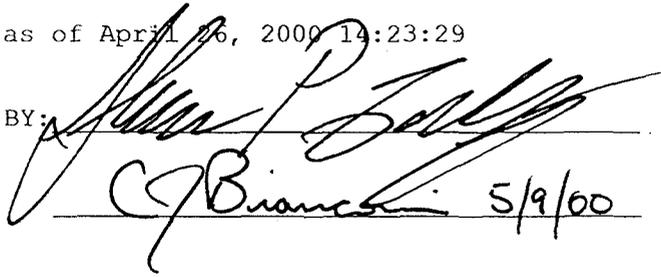
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	0.0 \pm 1.8	2.04	-7.86E-05 \pm 3.83E-03	Unknown
Po214	-0.7 \pm 0.7	0.68	-1.42E-03 \pm 1.42E-03	Unknown
Po212	-1.4 \pm 1.0	1.36	-2.83E-03 \pm 2.00E-03	Unknown
Po210	1,586.5 \pm 40.1	11.55	3.305 \pm 0.083	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	-2.55E-04 \pm 0.012	5.94E-02
Po214	Po214	1.000	-4.59E-03 \pm 4.59E-03	4.20E-02
Po212	Po212	1.000	-9.18E-03 \pm 6.49E-03	5.19E-02
Po210	Po210	1.000	10.718 \pm 0.305	1.16E-01

Activity reported as of April 26, 2000 14:23:29

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

Spike level
 22.892 d/m
 pu 239

OASIS - MCA

File Edit View AcqParams Tools Reports Close Help

Library: Am241 Nuclide: Am241

DAS_STD.MDB

Acq ALL Acquire Stop

4095

LOG

Lim Log Start

Peak

Reset ROI Conts Display Integ FWHM

0

4095

Spectrum ID

00A1148-034.001

System Date

27-Apr-2000 07:16:26

Channel: 1857 Elapsed Rad Time: 28800.633 Selected Time: 28800.000 Dead Time: 0.0

Energy: 5186.3 Counts: 23 ROI: Integral: 1.598 Peak: 5.246.66 FWHM: 113.29

Sample ID: 00A1148-035.001

Type: Unknown

Batch ID: unknowns
Acquisition Start: April 26, 2000 10:13:08
Analysis Date: April 26, 2000 13:22:47
Procedure: Po210 count
Device: Oasis:01:03
Analysis Method: ROI Analysis
Spectrum File: 00000492.OXS LiveTime: 11,351.00

Calibrations:
Energy = 6.596E+01 +2.779E+00 * Chn Coeff. of Correlation: -0.998
Calibration Date: April 24, 2000 13:03:27 Std: 1:3 Energy Cal
Shape not Calibrated.
Efficiency = 3.120E-01 ± 4.098E-03
Calibration Date: April 24, 2000 10:05:48 Std: TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5827.5	2.8
2 Po214	Po214	6588.5	7874.7	7231.0	2.8
3 Po212	Po212	8393.8	8808.6	8601.2	0.3
4 Po210	Po210	2180.3	5343.3	5249.4	67.3

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	2.7 ± 1.8	0.27	0.014 ± 9.27E-03	Unknown
Po214	2.7 ± 1.8	0.27	0.014 ± 9.27E-03	Unknown
Po212	-0.5 ± 0.4	0.54	-2.85E-03 ± 2.01E-03	Unknown
Po210	562.5 ± 23.9	7.54	2.973 ± 0.126	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.046 ± 0.030	7.84E-02
Po214	Po214	1.000	0.046 ± 0.030	7.84E-02
Po212	Po212	1.000	-9.13E-03 ± 6.45E-03	9.19E-02
Po210	Po210	1.000	9.529 ± 0.424	2.18E-01

Activity reported as of April 26, 2000 10:13:08

ANALYSIS REVIEWED BY: [Signature]

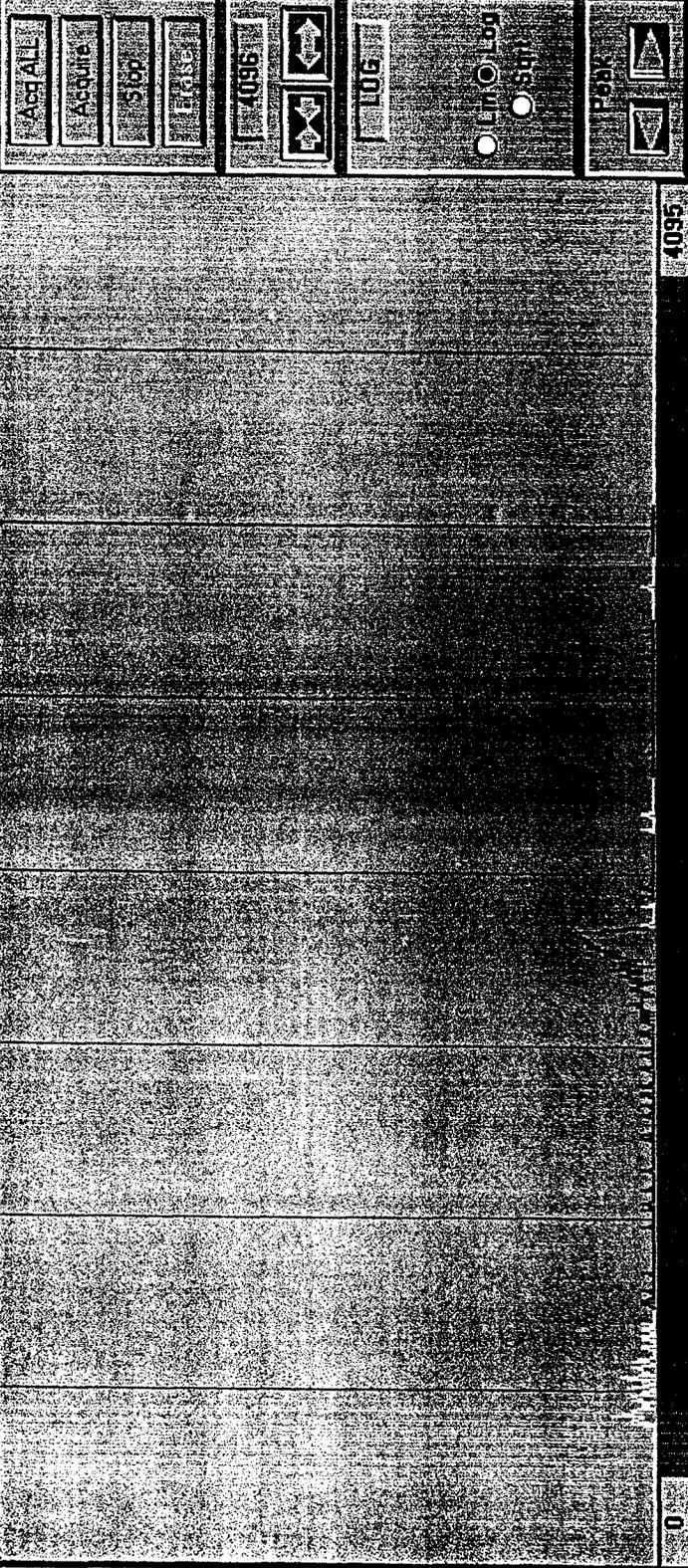
APPROVED BY: CJ Bianconi 5/9/00

Spike level:
22.950 dpm
Pv239

OASIS - MCA

File Edit View Acq Params Loads Reports Close Help

Library: OAS_STD.MDB NucInds: Am241



00A1148-035.001

System Date: 26-Apr-2000 13:43:28

Channel: 1093 Elapsed Real Time: 11:35:10.0 Elapsed Live Time: 11:35:10.0 Dead Time: 0.0

Message Window

Energy: 3103.9 Counts: 0 ROI: 570 Peak: 5,249.36 FWHM: 67.26

Acq ALL Acquire Stop

4095 LOG

Lin Log Stop

4095

ROIs CONTROLS DISPLAY WINDOW AUTO DISP

Sample ID: 00A1148-036.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 26, 2000 10:13:06
 Analysis Date: April 26, 2000 13:13:28
 Procedure: Po210 count
 Device: Oasis:01:02
 Analysis Method: ROI Analysis
 Spectrum File: 00000501.OXS **LiveTime:** 10,800.00

Calibrations:
 Energy = 5.823E+01 +2.790E+00 * Chn **Coeff. of Correlation:** -0.998
 Calibration Date: April 07, 2000 14:55:56 **Std:** 1:2 energy cal
 Shape not Calibrated.
 Efficiency = 3.089E-01 ± 4.062E-03
 Calibration Date: April 07, 2000 15:15:30 **Std:** TS4189

External Recovery No Ext.Recovery
Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5826.0	2.8
2 Po214	Po214	6588.5	7874.7	7229.6	2.8
3 Po212	Po212	8393.8	8808.6	8599.7	2.8
4 Po210	Po210	2180.3	5343.3	5276.3	15.6

ROI ANALYSIS RESULTS

ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	3.0 ± 1.7	0.00	0.017 ± 9.62E-03	Unknown
Po214	0.7 ± 1.0	0.26	4.13E-03 ± 5.74E-03	Unknown
Po212	1.0 ± 1.0	0.00	5.56E-03 ± 5.56E-03	Unknown
Po210	417.4 ± 20.6	4.62	2.319 ± 0.114	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.054 ± 0.031	4.87E-02
Po214	Po214	1.000	0.013 ± 0.019	8.23E-02
Po212	Po212	1.000	0.018 ± 0.018	4.87E-02
Po210	Po210	1.000	7.506 ± 0.383	1.91E-01

Activity reported as of April 26, 2000 10:13:06

ANALYSIS REVIEWED BY: *Michael Collier*

APPROVED BY: *C. J. Bianco* 5/8/00

22-902 d/n
P. 235

Library: **DAS_STD.MDB** Nuclide: **Am241**

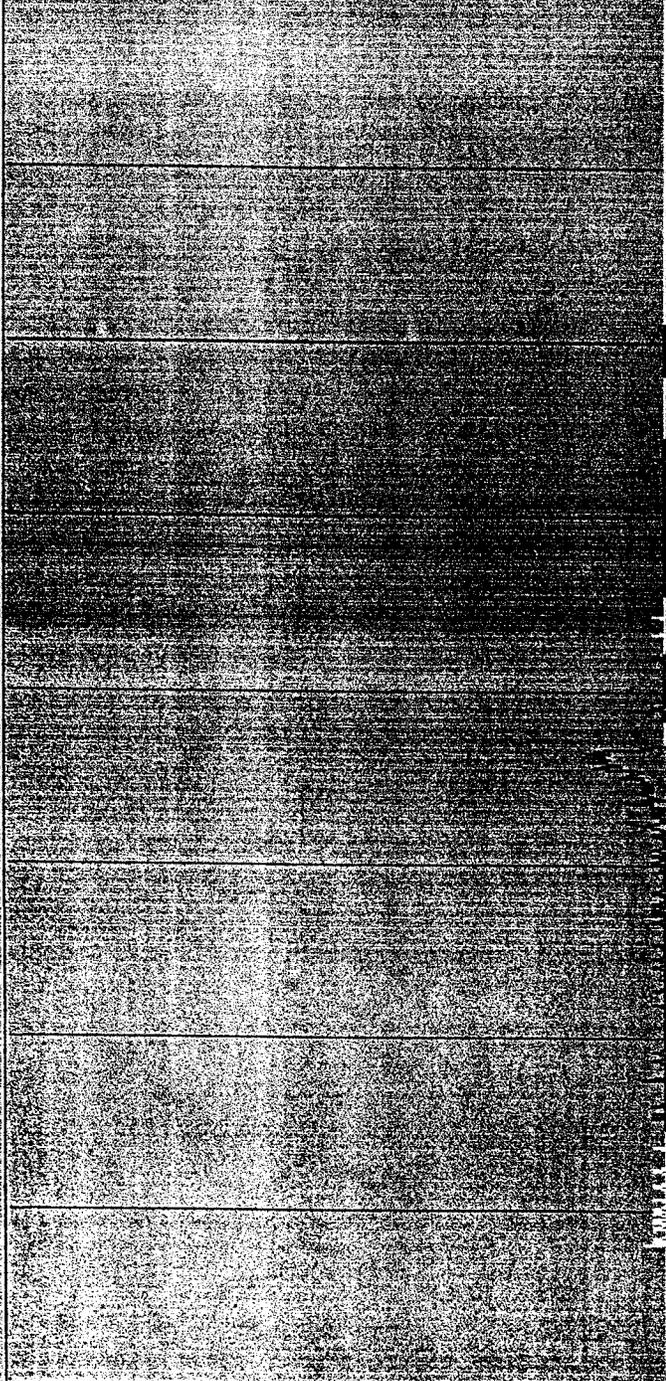
Acq All Acquire Stop Erase

4096

LOG Lin Log Sqr

PEAK

Plot Fit F10 F11 F12 F13 F14 F15 F16 F17 F18 F19 F20



4095

00A1148-036.001 Spectrum (D)

System Date: 26-Apr-2000 13:38:21

Channel: 3526 Elapsed Real Time: 10800.09 Elapsed Live Time: 10800.00 Dead Time: 0.0

Message Window

Energy: 10175.9 Count: 0 ROI: Ingate Peak: FWHM

5/2

Sample ID: 00A1148-037.001 **Type:** Unknown
 Batch ID: unknowns
 Acquisition Start: April 27, 2000 09:27:34
 Analysis Date: May 01, 2000 06:34:12
 Procedure: Po210 count
 Device: Oasis:01:03
 Analysis Method: ROI Analysis
 Spectrum File: 00000511.OXS **LiveTime:** 28,800.00

Calibrations:
 Energy = $6.596E+01 + 2.779E+00 * \text{Chn}$ **Coeff. of Correlation:** -0.998
 Calibration Date: April 24, 2000 13:03:27 **Std:** 1:3 Energy Cal
 Shape not Calibrated.
 Efficiency = $3.120E-01 \pm 4.098E-03$
 Calibration Date: April 24, 2000 10:05:48 **Std:** TS4189

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5550.0	6104.5	5827.5	2.8
2 Po214	Po214	6588.5	7874.7	7231.0	2.8
3 Po212	Po212	8393.8	8808.6	8601.2	4.2
4 Po210	Po210	2180.3	5343.3	5285.5	9.6

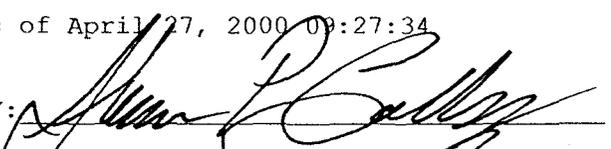
ROI ANALYSIS RESULTS

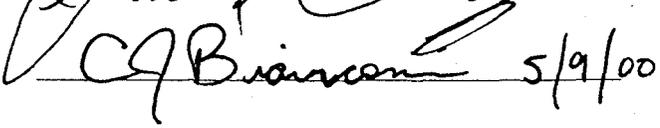
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	7.3 ± 2.9	0.68	0.015 ± 6.06E-03	Unknown
Po214	6.3 ± 2.7	0.68	0.013 ± 5.69E-03	Unknown
Po212	7.6 ± 3.2	1.37	0.016 ± 6.57E-03	Unknown
Po210	354.9 ± 19.7	19.13	0.739 ± 0.041	Unknown

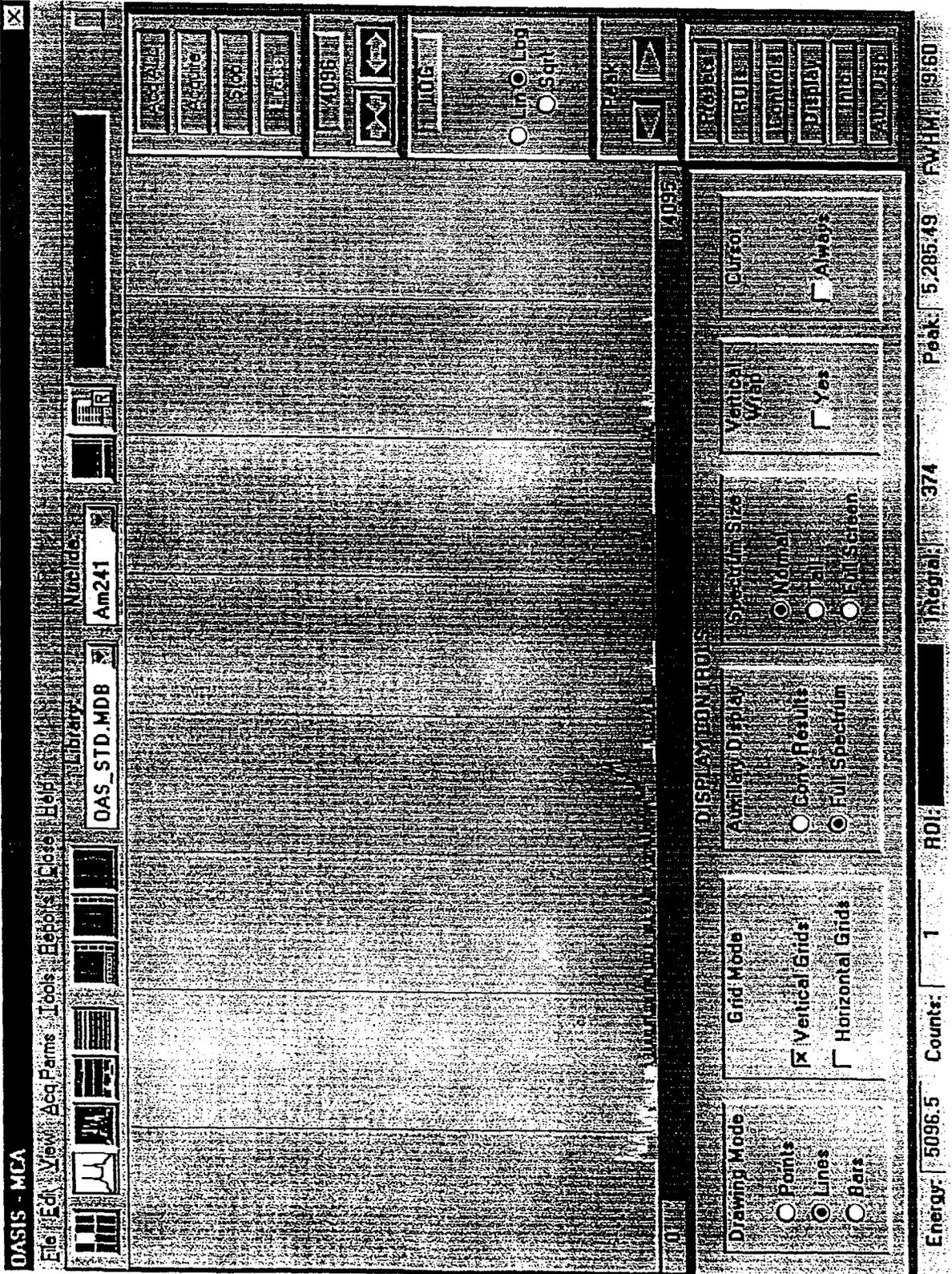
NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.049 ± 0.019	4.16E-02
Po214	Po214	1.000	0.042 ± 0.018	4.16E-02
Po212	Po212	1.000	0.051 ± 0.021	5.14E-02
Po210	Po210	1.000	2.370 ± 0.135	1.43E-01

Activity reported as of April 27, 2000 09:27:34

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00



00A1148-037.001

Figure 30. Example Po-210 spectrum (log scale mode).

591

Oasis Device # 2

RFETS; Golden, CO
Apr 24, 2000 09:53:44

Sample ID: 00A1148-038.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 19, 2000 10:33:42
Analysis Date: April 24, 2000 09:53:38
Procedure: polonium210 samples
Device: Oasis:02:02
Analysis Method: ROI Analysis
Spectrum File: 00000288.OXS LiveTime: 72,000.00

Calibrations:

Energy = $1.436E+01 + 2.491E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:25:18 Std: 2:2 energy calibration
Shape not Calibrated.
Efficiency = $3.436E-01 \pm 4.641E-03$
Calibration Date: April 05, 2000 09:05:57 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount: 1.000 ± 0.000 samp
Aliquot Amount: 1.000 ± 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
1	Po218	5552.6	6077.8	5814.5	2.5
2	Po214	7420.0	7770.1	7593.4	2.5
3	Po212	8521.5	8850.6	8687.1	1.2
4	Po210	2263.7	5402.1	5273.8	7.9

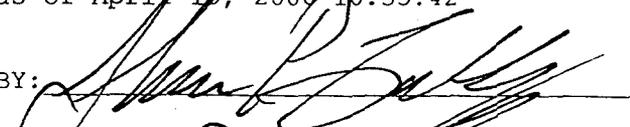
ROI ANALYSIS RESULTS

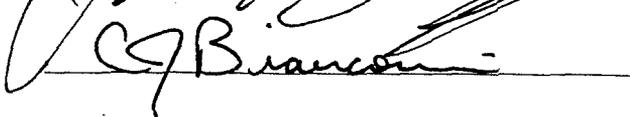
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	6.0 ± 5.7	10.00	$5.00E-03 \pm 4.76E-03$	Unknown
Po214	-3.0 ± 3.2	5.00	$-2.50E-03 \pm 2.68E-03$	Unknown
Po212	0.0 ± 0.0	0.00	$0.00E+00 \pm 0.00E+00$	Unknown
Po210	774.0 ± 31.4	80.00	0.645 ± 0.026	Unknown

NUCLIDE ANALYSIS RESULTS

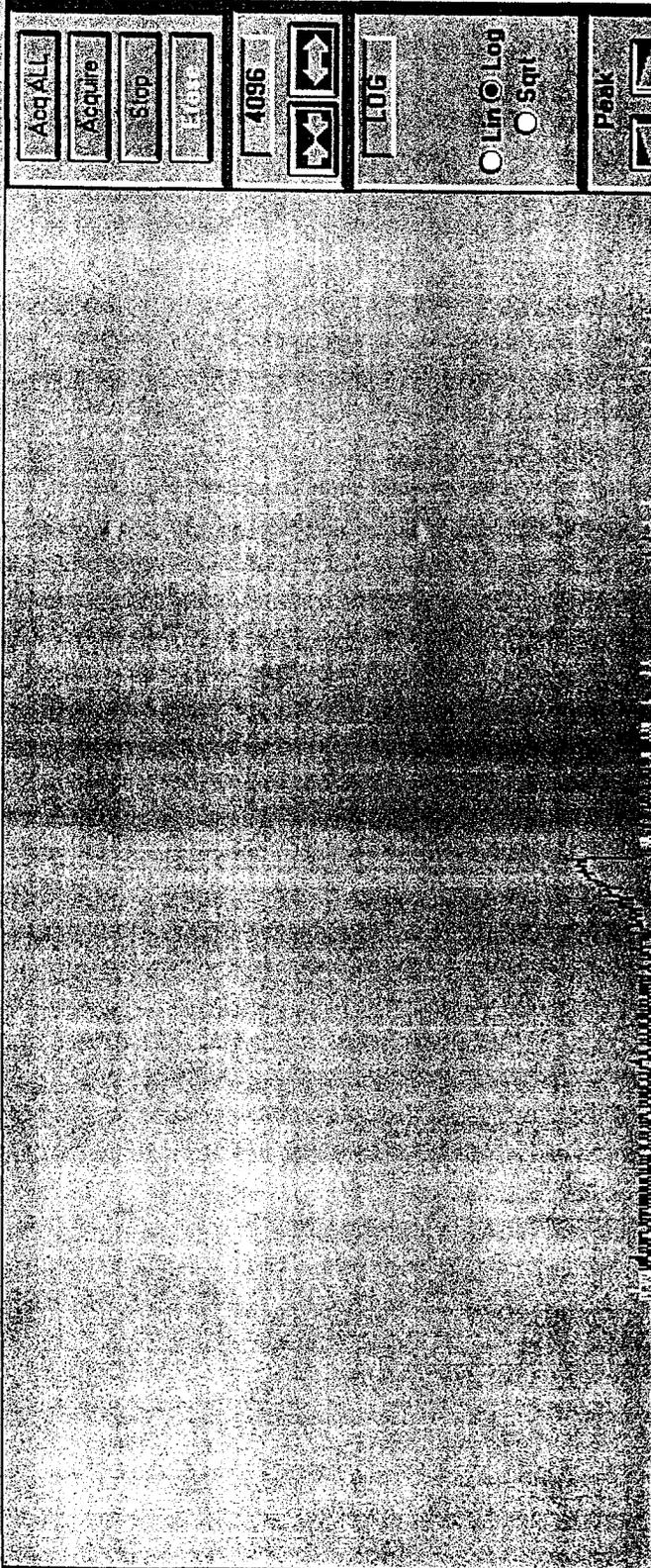
ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.015 ± 0.014	4.78E-02
Po214	Po214	1.000	$-7.28E-03 \pm 7.80E-03$	3.57E-02
Po212		1.000	$0.00E+00 \pm 0.00E+00$	6.56E-03
Po210	Po210	1.000	1.877 ± 0.080	1.23E-01

Activity reported as of April 19, 2000 10:33:42

ANALYSIS REVIEWED BY: 

APPROVED BY: 

596



0 4095

Acq ALL Acquire Stop EGate

4096 LOG

Lin Log Sqr

Peak

00A1148-038-001

Spectrum ID

System Date: 10-May-2000 06:59:33

Channel: 1692 Elapsed Real Time: 72000.08 Elapsed Live Time: 72000.00 Dead Time: 0.0

Message Window

Energy: 4231.1 Counts: 0 ROI: 854 Peak: 5,273.83 FWHM: 7.92

596

Oasis Device # 2

RFETS; Golden, CO

Apr 20, 2000 07:01:56

Sample ID: 00A1148-039.001 Type: Unknown
Batch ID: unknown
Acquisition Start: April 19, 2000 10:33:43
Analysis Date: April 20, 2000 06:56:35
Procedure: polonium210 samples
Device: Oasis:02:03
Analysis Method: ROI Analysis
Spectrum File: 00000287.OXS LiveTime: 72,000.00

Calibrations:

Energy = $1.604E+02 + 2.389E+00 * \text{Chn}$ Coeff. of Correlation: -0.998
Calibration Date: April 04, 2000 15:34:53 Std: 2:3 energy cal
Shape not Calibrated.
Efficiency = $3.357E-01 \pm 4.547E-03$
Calibration Date: April 05, 2000 09:20:34 Std: AS 4188

External Recovery No Ext.Recovery

Original Sample Amount:

Aliquot Amount: 1.000 \pm 0.000 samp
1.000 \pm 0.000 samp

ROI DATA

ROI ID #	ASSOCIATED NUCLIDE	EXTENTS		PK EN (keV)	FWHM (keV)
		START	END		
1 Po218	Po218	5552.6	6077.8	5815.3	3.6
2 Po214	Po214	7420.0	7770.1	7595.1	2.4
3 Po212		8521.5	8850.6	8686.9	2.4
4 Po210	Po210	2263.7	5402.1	5175.0	4.5

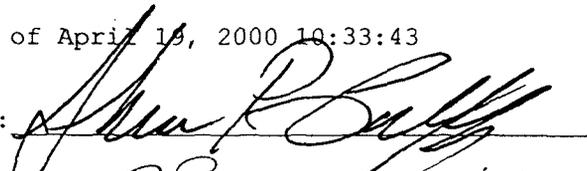
ROI ANALYSIS RESULTS

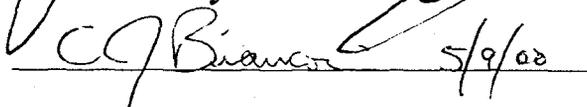
ROI ID	NET COUNTS	BKG/INTERF	CPM	ROI TYPE
Po218	7.0 \pm 4.5	5.00	5.83E-03 \pm 3.76E-03	Unknown
Po214	1.7 \pm 3.2	3.33	1.39E-03 \pm 2.71E-03	Unknown
Po212	0.7 \pm 3.1	3.33	5.56E-04 \pm 2.58E-03	Unknown
Po210	889.3 \pm 32.5	61.67	0.741 \pm 0.027	Unknown

NUCLIDE ANALYSIS RESULTS

ROI ID	ASSOC NUC	EMM. PROB	ACTIVITY (dpm/samp)	MDA (dpm)
Po218	Po218	1.000	0.017 \pm 0.011	3.65E-02
Po214	Po214	1.000	4.14E-03 \pm 8.06E-03	3.11E-02
Po212		1.000	1.65E-03 \pm 7.67E-03	3.11E-02
Po210	Po210	1.000	2.207 \pm 0.086	1.11E-01

Activity reported as of April 19, 2000 10:33:43

ANALYSIS REVIEWED BY: 

APPROVED BY:  5/9/00

597

OASIS - MCA
 File Edit View Acq Params Tools Reports Close Help
 Library: DAS STD.MDB Am241 5 State: 00000287.DXS
 Acq ALL Acquire Stop Erase
 4096 LOG
 Lin Log Sqrt
 Peak
 Presets ROI's Controls Display Info Avg Disp
 Spectrum ID: 00A1148-039.001
 System Date: 10-May-2000 07:01:17
 Channel: 1087 Elapsed Real Time: 72000.04 Elapsed Live Time: 72000.00 Dead Time: 0.0
 Energy: 2757.7 Counts: 0 ROI: Integral: 951 Peak: 5.175.02 FWHM: 4.51

00A1148
Data Package Narrative

Four waste samples, under the Subcontract Number KH700331EP6, were received on May 15, 2000. Four samples were analyzed by Alpha Spectroscopy for Polonium-210, Plutonium 239/240, Uranium-233/234,235,238, and Americium 241.

- Analytical Method: EPI A-011 (Alpha Spec)
- Matrix Interferences: There are no matrix interferences to report.
- QC Deficiencies: There were no deficiencies.
- Hold Times: All samples were analyzed within the required holding time.
- RDLs: There were no failed detection limits.
- Reanalysis Information: There were no reanalysis of the samples.
- Deviations from SOP: See following page.

Comments:

1. RC01CAL_EPI_3-JUN-2000, RC01CAL_EPI_4-JUN-2000 correspond to RC01CAL_EPI_01JUN2000.
2. The following samples did not meet the FWHM requirement of < 80 keV.

1000060362_PU	94 keV
1000060364_PU	92 keV
1000061142_UU	85 keV

3. Sample 00A1148-031.002, 00A1148-034.002 and QC 1000061142 were recounted due to failed yield.

017

9-1

599 P. 02

FAX NO. 303 966 5279

SUPPORT SERVICES

JUN-22-00 THU 16:26

Batch #: 27172
RIN 00A1148
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1148-015.002	25798001	Polonium-210	2.76E+00	8.17E-01	1.70E-01	1.00	68.72
00A1148-019.002	25798002	Polonium-210	2.74E+00	5.74E-01	1.56E-01	1.00	46.74
00A1148-031.002	25798003	Polonium-210	3.80E+00	8.39E-01	2.84E-01	1.00	54.27
00A1148-034.002	25798004	Polonium-210	5.07E+00	1.26E+00	2.22E-01	1.00	57.88
1000060355	Blank	Polonium-210	5.39E-02	8.61E-02	1.53E-01	1.00	49.73
1000061844	Duplicate 00A1057-002.001	Polonium-210	2.47E+00	5.60E-01	1.65E-01	1.00	70.11
1000060358	LCS	Polonium-210	1.37E+01	1.12E+00	1.73E-01	1.00	59.83

LCS recovery:

210	Nom. Conc. 15.4	Recovery: 89%
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Equivalency:
Po-210

F/E = 1.319

Batch #: 27174
RIN 00A1148
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1148-015.002	25798001	Plutonium-239/240	3.74E-01	1.68E-01	5.33E-02	0.30	95.36
00A1148-019.002	25798002	Plutonium-239/240	-9.15E-03	1.79E-02	1.13E-01	0.30	39.51
00A1148-031.002	25798003	Plutonium-239/240	-2.74E-02	3.10E-02	1.58E-01	0.30	62.53
00A1148-034.002	25798004	Plutonium-239/240	1.62E-02	6.79E-02	1.85E-01	0.30	59.66
1000060362	Blank	Plutonium-239/240	0.00E+00	0.00E+00	2.62E-02	0.30	81.37
1000061141	Duplicate 00A1148-031.002	Plutonium-239/240	0.00E+00	0.00E+00	6.05E-02	0.30	66.68
1000060364	LCS	Plutonium-239/240	5.04E+00	3.93E-01	2.16E-02	0.30	97.91

LCS recovery:

-239/240

Nom. Conc.
5.7

Recovery:
88%

Equivalency:
Pu-239/240

F/E = 0.883

4-3

601

Rocky Flats

Sample QC Results Summary
6/13/00

Batch #: 27173
RIN 00A1148
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1148-015.002	25798001	Americium-241	1.09E-01	9.57E-02	5.92E-02	0.30	81.49
00A1148-019.002	25798002	Americium-241	4.20E-02	3.72E-02	4.51E-02	0.30	89.13
00A1148-031.002	25798003	Americium-241	0.00E+00	0.00E+00	3.44E-02	0.30	85.19
00A1148-034.002	25798004	Americium-241	1.45E-02	6.08E-02	1.66E-01	0.30	64.68
1000060359	Blank	Americium-241	3.54E-02	4.01E-02	6.37E-02	0.30	86.16
1000061138	Duplicate 00A1148-031.002	Americium-241	0.00E+00	0.00E+00	4.27E-02	0.30	90.73
1000060361	LCS	Americium-241	4.39E+00	3.71E-01	2.21E-02	0.30	95.55

LCS recovery:

Am-241	Nom. Conc. 4.5	Recovery: 98%
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Equivalency:
Am-241

F/E = 0

9-4

Batch #: 27175
RIN 00A1148
Line Item Code: TR01A187
Matrix: Misc. solid

KHCO ID #	GEL ID #	Analysis	Result pCi/g	2sigma Error pCi/g	MDA pCi/g	RDL pCi/g	Tracer Yield %
00A1148-015.002	25798001	Uranium-233/234	3.48E-02	6.21E-02	1.24E-01	1.00	104.52
		Uranium-235	-7.52E-03	4.34E-02	1.41E-01	1.00	104.52
		Uranium-238	6.80E-04	4.04E-02	1.24E-01	1.00	104.52
00A1148-019.002	25798002	Uranium-233/234	1.72E-02	2.85E-02	5.57E-02	1.00	99.31
		Uranium-235	-2.69E-03	2.33E-02	6.66E-02	1.00	99.31
		Uranium-238	-9.39E-03	1.93E-02	6.66E-02	1.00	99.31
00A1148-031.002	25798003	Uranium-233/234	1.54E-02	3.96E-02	8.79E-02	1.00	107.82
		Uranium-235	-1.06E-02	1.46E-02	7.70E-02	1.00	107.82
		Uranium-238	1.04E-02	2.04E-02	2.82E-02	1.00	107.82
00A1148-034.002	25798004	Uranium-233/234	1.18E-01	8.36E-02	9.73E-02	1.00	105.49
		Uranium-235	-6.60E-03	1.30E-02	7.90E-02	1.00	105.49
		Uranium-238	6.56E-02	6.58E-02	9.73E-02	1.00	105.49
1000060365	Blank	Uranium-233/234	7.74E-04	2.65E-02	6.85E-02	1.00	104.63
		Uranium-235	-1.24E-02	1.21E-02	5.91E-02	1.00	104.63
		Uranium-238	2.58E-04	1.53E-02	4.69E-02	1.00	104.63
1000061142	Duplicate 00A1148-031-002	Uranium-233/234	2.02E-02	2.87E-02	4.87E-02	1.00	97.21
		Uranium-235	-8.22E-03	1.14E-02	6.00E-02	1.00	97.21
		Uranium-238	8.04E-03	2.52E-02	6.00E-02	1.00	97.21
1000060367	LCS	Uranium-233/234	3.89E+00	3.20E-01	6.78E-02	1.00	99.19
		Uranium-235	2.12E-01	7.62E-02	4.97E-02	1.00	99.19
		Uranium-238	4.19E+00	3.32E-01	5.67E-02	1.00	99.19

LCS recovery:

U-238	Nom. Conc. 4.336	Recovery: 97%
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Equivalency:

U-233/234	F/E = 0.098
U-235	F/E = 0.128
U-238	F/E = 0.073

603 P. 07

Luker, Steve
From: Salmans, Michael
Sent: Tuesday, June 13, 2000 3:04 PM
To: Luker, Steve
Subject: FW: 00A1148

Mike Salmans
Analytical Services
Phone # 303-966-5057
Pager # 303-212-3149
Fax # 303-966-3578

-----Original Message-----

From: Lee Heath [SMTP:lmh@mail.gel.com]
Sent: Tuesday, June 13, 2000 2:26 PM
To: Michael Salmans
Subject: 00A1148

The 100% size of these circular disks of metal and rubber were:

(1-4 in order)
0.7182 g
1.8692 g
2.1784 g
0.7303 g (rubber)

604 / 604

9-6