

Rocky Flats Environmental Technology Site

Building 776/777

Area V

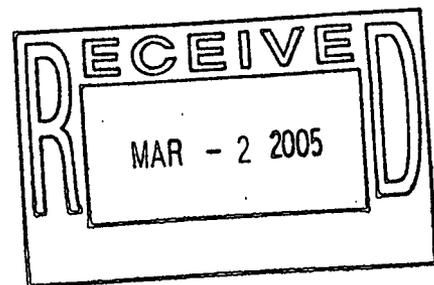
Final

Survey Report

Survey Units:
776009

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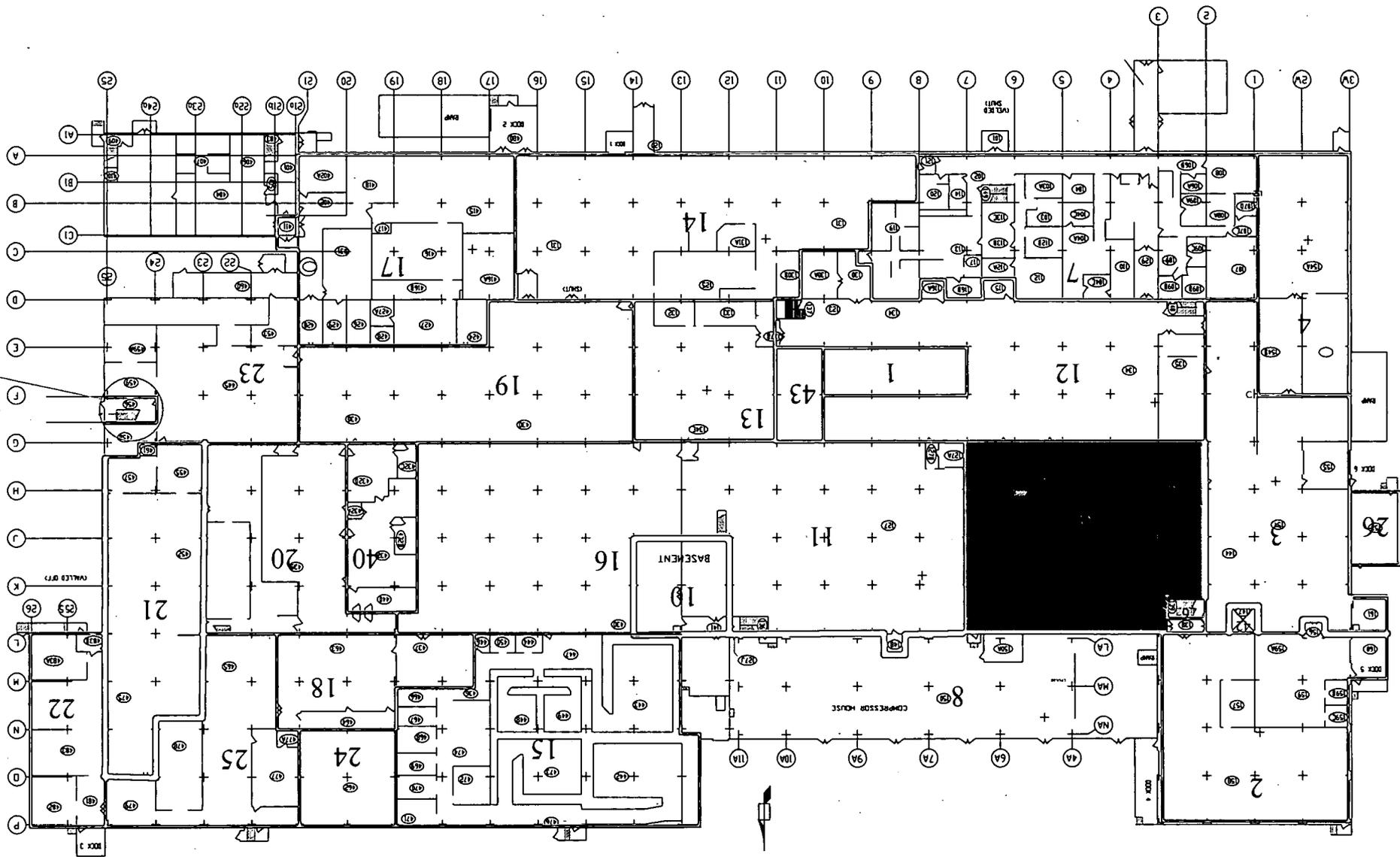
January 2005



ADMIN RECORD

37

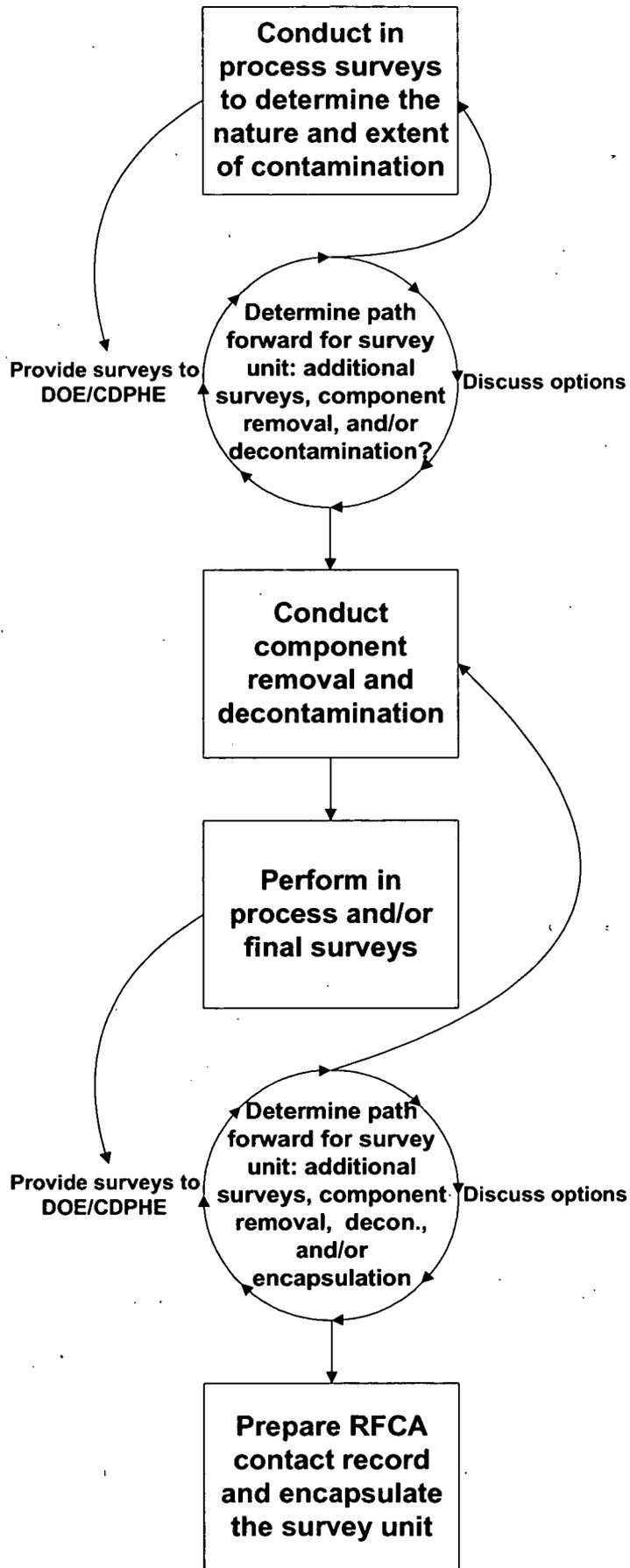
B776/777 SURVEY UNITS 1st FLOOR



ABOVE RMS 456,
459 AND 459A
INCLUDES RMS456



CONSULTATIVE PROCESS



Final Survey Instructions

Building 776 1st Floor

Survey Unit 776009

Purpose:

This instruction provides guidance for collecting gross gamma and removable contamination data to quantify the amount of residual contamination in Survey Unit 776009 prior to demolition. NaI measurements are performed in accordance with "INS-535-Ludlum2350-1 with Sodium Iodide Detector".

Equipment and materials:

1. A Ludlum 44-17 attached to a Ludlum 2350-1 set to collect five-minute counts that will be displayed on its LCD window.
2. A Bicon G-5 attached to a Ludlum 2350-1 set to collect five-minute counts that will be displayed on its LCD window.
3. One Electra with attached DP-6, calibrated and daily response checked.
4. Two probe holders, one for the G-5 and one for the 44-17 with tin shielding.
5. Calibrated and daily response checked SAC-4.
6. Measuring tape or laser range finder.

Note: The NE Electra with DP-6 probe and the Eberline SAC-4 shall be used in accordance with RSP- 7.01 and 7.02

Procedure:

1. Inspect instrument for obvious damage and ensure battery voltage is equal to or greater than 4.6 volts. If battery voltage is less than 4.6 volts change the batteries.
2. Complete daily performance checks for Sodium Iodide detectors to ensure the instrument is functioning properly by using Americium-241 source TS-912. Record results on Sodium Iodide Data Sheet.
3. For floor and concrete wall background measurements, perform a 300-second background count (on contact with floor) with a Bicon G-5 for floors or Ludlum 44-17 for walls at background location in room 404. Record background counts next to "Bkg Floor" or "Bkg Concrete Wall" in background column of attached "Sodium Iodide Data Collection" sheets as needed.
4. For block wall background measurements, perform a 300-second background count (on contact with block wall) with a Ludlum 44-17 at background location in room 404. Record background counts next to "Bkg Block Wall" in background column of attached Sodium Iodide data collection sheets as needed.
5. For ceiling background measurements, perform a 300-second background count with a Ludlum 44-17 at background location in room 404. Hold the probe waist high, pointed toward ceiling and place a sheet metal plate in front of the detector (take background measurement in this configuration). Record background counts next to "Bkg Metal Ceiling" in background column of attached Sodium Iodide data collection sheets as needed.
6. Mark the sample locations on the surfaces to be measured. Take all measurements on contact with the marked surface using tin side shields on the Bicon G-5 and tin side and back shields on the Ludlum 44-17. All Sodium Iodide readings shall have 300 second count times.
7. Collect sodium Iodide, total surface activity and removable surface activity measurements (60 second count times for TSA and RSA measurements, including local area backgrounds) at all locations marked on the attached map.
8. Record the NaI and NE Electra measurements on the attached sheets. Note any items or conditions that may have affected the measurement in the "remarks" section.
9. Count swipes for 60 seconds with a SAC-4, record result on attached sheet for removable contamination.

Final Survey Instructions

Building 776 1st Floor

Survey Unit 776009

Table 776009-1: Survey Requirements

Surface	Type of Survey	Probe	Placement	Count Time
Floors and cement walls	Total Alpha Activity	Bicron G-5 or Ludlum 44-17	On contact	300 seconds
All Surfaces	Total Alpha Activity	Electra with DP-6	On contact	60 seconds
Block walls	Total Alpha Activity	Bicron G-5 or Ludlum 44-17	On contact	300 seconds
All Surfaces	Removable Alpha	SAC-4	Swipe in placed in tray	60 seconds
Ceiling	Total Alpha Activity	Ludlum 44-17	On Contact	300 seconds
Block Walls	Background measurement	Bicron G-5 or Ludlum 44-17	On contact with block wall at background location in room 404.	300 seconds
Floors and cement walls	Background measurement	Bicron G-5 or Ludlum 44-17	On contact with floor at background location in room 404.	300 seconds
Metal ceilings	Background measurement	Ludlum 44-17	Probe waist high, pointed toward ceiling with sheet metal plate on end at background location in room 404.	300 seconds

FINAL SURVEY REPORT

Survey Unit 776009

1) Introduction and Scope

A pre-demolition radiological survey (PDS) is performed prior to building demolition to define the radiological conditions of a facility. A PDS survey for survey unit 776009 has been completed in accordance with guidelines outlined in the "Radiological Pre-Demolition Survey Plan Building 776/777". Based on the results it is recommended that no further remediation is needed, and that the survey unit may be encapsulated in preparation for demolition. Isolation controls shall be put in place to prevent recontamination of the area. This report has been prepared in accordance with sections 3 and 8 of the "Radiological Pre-Demolition Survey Plan Building 776/777".

Building 776 room 134 is bounded by column lines 2 and 7 to the west and east and G and L to the south and north. Room 146, the size reduction vault and room 118, the fluidized bed incinerator, were located within room 134. This area is part of the original building. At the time of the 1969 fire room 134 contained several gloveboxes that supported plutonium foundry operations. Room 146 is part of the original construction of building 776 and was used as a Plutonium storage vault until the 1969 fire. After the 1969 fire the size reduction vault was used for cleaning and size reducing contaminated equipment and rooms 146A and 146B were added to the south end of the vault. After completion of fire cleanup activities the SRV was used for container repackaging, washing leaded gloves and metal equipment in a ball mill, crushing HEPA filters and empty drums in a drum crusher and consolidating wastes into crates. By 1974 all gloveboxes were removed. In 1975 the walls making up the 118 rooms were built and the fluidized bed incinerator was installed.

2) PDS Methods and Techniques

The PDS survey results determine the Average Surface Contamination Value (ASCV_u) and source term for the survey unit. These parameters are used determine whether the building may be demolished within the limits outlined in the "Radiological Pre-Demolition Survey Plan Building 776/777".

To obtain a statistically powerful number of data points, a minimum of 30 survey points were selected per survey unit. A random start, systematic grid method was used to identify the survey point locations. Three types of surveys are performed at each survey point as follows:

- a) Painted surfaces are evaluated for potential contamination under coatings using sodium iodide (NaI) gamma detectors attached to a single channel analyzer windowed for the 59 keV gamma-ray (Am^{241}). The standard background reference in room 119, near column C-9, was used. Since these gamma measurements quantify contamination at depth as well as the surface, this survey data is used to estimate contamination levels on all surfaces of the survey unit.
- b) Direct alpha surface contamination measurements are performed using a NE Electra survey instrument with attached DP-6 probe. This data may be compared to the NaI survey data to show the fraction of contamination that is directly on the surface verses imbedded in the material matrix.

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Survey Unit 776009

- c) Removable surface alpha contamination surveys were performed by swiping the survey point with a 47mm filter paper then counting the filter paper on a SAC-4 alpha counter. This data may be used to gauge the effectiveness of encapsulation following the PDS.

To conservatively determine the final Average Surface Contamination Value (ASCV_u) for the survey unit, the source term associated with inaccessible areas of the survey unit (as described in section 4 of this report) is added to the source term calculated by the PDS survey.

One survey point (point 26) collected on wall 5-A was elevated (728,827 dpm/100 cm² total alpha). Wall 5-A is a solid concrete wall that is marked as a "special demolition control" wall. Further decontamination may be performed prior to building demolition. Two PDS survey points (9 and 19) are also elevated. These two elevated points were collected on wall sections that are to be removed and the data collected for these points has been used as part of the SCO characterization survey for rubble being added to survey unit 776010.

3) ALARA Post Remediation Surveys

In addition to the PDS used to determine the Average Surface Contamination Value (ASCV_u) and source term for the survey unit, surveys were taken to determine the effectiveness of remediation efforts.

Remediation is performed to demonstrate a reasonable best effort is made to maintain releases to the environment and doses to the workers ALARA. Remediation may include decontamination, or removal of parts of the structure such as block wall removal.

a) Floors

The in-process surveys identified widespread contamination associated with the floors in survey unit 776009 at an average activity of 20,911,185 dpm/100 cm². The decision was made for the entire floor area of survey unit 776009 to be removed and packaged as SCO waste which will not be considered in this report.

b) Walls

"High density" NaI surveys were performed on walls in Area III to develop a risk based classification of walls. Additionally, a series of holes were made in the hollow block to provide internal contamination levels. The general trend of contamination levels showed the highest levels at the top and the lowest levels at the bottom. This data along with the identification of load-bearing walls provided the basis for classification of building 776 area V walls into three categories:

- i) Type I – Structural or non-structural wall with average contamination levels ranging from < MDA to approximately 100,000 dpm/100 cm². These walls require no further remediation.
- ii) Type II – Structural or non-structural wall with average contamination levels that range from >100,000 dpm/100cm² to <1,000,000 dpm/100cm². Some of the type II

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walls are structural and it has been determined by Engineering that removal is not allowed. For non-structural type II walls partial removal was performed to eliminate the inaccessible area at the top of wall. This will allow additional engineering controls to be applied to minimize the risk of a localized airborne event during demolition.

- iii) Type III - Structural or non-structural wall with average contamination levels that exceed $>1,000,000$ dpm/100cm². Some of the type III walls are structural and it has been determined by Engineering that no remediation is allowed. Additional mitigating techniques will be utilized to minimize the potential of a localized airborne event during demolition. For non-structural type III walls partial removal was performed to eliminate the inaccessible area at the top of wall. This will allow additional engineering controls to be applied to minimize the risk of a localized airborne event during demolition.

Survey measurements on walls were taken on an established 3 ft by 3 ft grid pattern. Due to the removal of the floor of unit 776009, 58 of the designated wall sections will be removed and packaged as SCO waste prior to building demolition. Four of the wall sections (9-2A, 9-3A, 9-3B and 9-3C) were demolished during SRV demolition. 16 of the remaining 51 wall sections to be removed were surveyed as part of the SCO characterization, the remainder were not formally surveyed. Rubble from the 54 wall sections will be placed in the basement (survey unit 776010) and the source term will be accounted for in a revised version of the survey unit 776010 final survey report.

Walls not designated for removal are denoted in table 1 of this report. The wall in-process ASCVu was found to be 343,814 dpm/100 cm². Remediation efforts yielded a considerable reduction in source term of 50%, or a decontamination factor (DF) of 2.0, reducing average contamination levels to 172,130 dpm/100 cm².

Table 1
B776/777 Survey Unit 776009, Area V Wall Summary

Wall	Section	Area (m ²)	Comments	Initial Characterization (dpm/100 cm ²)			Follow-up Characterization (dpm/100 cm ²)			Wall Section Inventory (uCi)
				Type I	Type II	Type III	Type I	Type II	Type III	
776009-4	A	4.9	Orange wall		597,827			305,014		67.01
776009-5	A	32.5	Orange wall		977,542			575,242		842.55
776009-6	A	4.9	structural		200,723					10.61
776009-6	B	32.5	structural		236,601			158,742		232.51
776009-6	C	32.5	structural		331,501			165,569		242.51
776009-6	D	32.5	structural		338,291					127.78
776009-6	E	19.2	structural		441,124					85.32
776009-14	A	12.3	structural		125,517					52.13
776009-14	B	30.4	structural		199,891			144,030		197.28
776009-14	C	32.5	structural		209,012			166,473		243.83
776009-14	D	22.2	structural		206,346			REMOVED		0.00
776009-14	E	32.5	structural		323,226				137,138	200.86
776009-15	A	3.9								9.60

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Survey Unit 776009

Wall	Section	Area (m ²)	Comments	Initial Characterization (dpm/100 cm ²)			Follow-up Characterization (dpm/100 cm ²)			Wall Section Inventory (uCi)
				Type I	Type II	Type III	Type I	Type II	Type III	
776009-16	A	10.3								38.54
		Tot. Area:		Avg. dpm/100 cm ² :			Avg. dpm/100 cm ² :			Total uCi:
		303.2		343,814			172,130			2,350.54
	Type 1: <100,000 dpm/100 cm ²									
	Type 2: >100,000 dpm/100 cm ² to <1,000,000 dpm/100 cm ²									
	Type 3: >1,000,000 dpm/100 cm ²									

c) Ceilings

The In-Process NaI survey of the ceilings identified seven survey grids (9-141 and 9-143 through 9-148) exceeding 100,000 dpm/100cm². PDS survey point 17 is representative of this area. The seven ceiling panels are composed of painted metal and are not expected to pose a risk for airborne contamination during building demolition. The seven survey grids above the SRV area are ineligible for remediation for safety reasons due to the unstable exposed soil beneath them and will be considered as a "special demolition controls" area during demolition.

Follow-up measurements of the area ranged from 11,269 dpm/100 cm² to 366,186 dpm/100cm² with an average activity of 55,868 dpm/100cm². Remediation efforts resulted in a decontamination factor (DF) of 1.3, or a reduction of 24%.

**Table 2:
Ceiling Remediation Results**

	Pre-Remediation (In-process)	Post-Remediation (follow-up)
Maximum (dpm/100cm ²)	419,357	366,186
Average (dpm/100cm ²)	73,500	55,686

4) Inaccessible Areas

a) Walls

The final PDS data is representative of all wall surfaces in survey unit 776009.

b) Ceilings

The final PDS data is representative of all ceiling surfaces in survey unit 776009.

FINAL SURVEY REPORT
Survey Unit 776009

5) PDS Survey Results Summary

The values for the accessible areas and inaccessible areas were summed and divided by the total area for the survey unit to calculate the "Average Surface Contamination Value" (ASCV_u) and source term for the survey unit. The results are summarized in Table 3 below:

Table 3:
PDS Final Results

	Final Results
776009 Source Term Inaccessible Areas (μCi)	N/A
776009 Source Term Accessible Areas (μCi)	4,032.04
776009 Total Source Term (μCi)	4,032.04
Survey Unit Area (m ²)	1,765
ASCV _u (μCi/m ²)	2.28
ASCV _u (dpm/100cm ²)	50,715

Table 3 Notes:

- a) Accessible area source term is the sum of source terms attributed to walls and ceiling as determined by the final PDS survey.
- b) The method for determination of ASCV_u values is described in "Attachments" section of this report.

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Survey Unit 776009 Follow-up Nal data
(Ceiling)

Location #	Column letter	Column Number	North	East	Elevation	Gross Counts	Probe Serial #	In-process dpm/100cm ²	Follow-up dpm/100cm ²
9-70	K	3	1	17	CEILING	165	199765	25,796	25,796
9-71	K	3	17	7	CEILING	364	199765	42,077	42,077
9-72	K	3	15	14	CEILING	402	199765	44,666	44,666
9-73	K	3	14	12	CEILING	140	199764	20,644	20,644
9-74	K	5	6	12	CEILING	123	199764	20,644	20,644
9-75	K	5	15	4	CEILING	72	15158	11,269	11,269
9-76	K	5	15	15	CEILING	58	15158	11,269	11,269
9-77	K	6	17	5	CEILING	80	15158	11,269	11,269
9-78	K	6	18	18	CEILING	166	199764	18,886	18,886
9-79	K	6	5	15	CEILING	223	199764	29,071	29,071
9-80	K	6	4	5	CEILING	67	15158	11,269	11,269
9-81	K	5	8	18	CEILING	189	15158	55,526	55,526
9-82	K	5	1	6	CEILING	86	15158	11,269	11,269
9-83	K	5	5	5	CEILING	181	199764	51,495	51,495
9-84	K	5	15	3	CEILING	142	199764	20,644	20,644
9-85	K	3	5	13	CEILING	681	199765	60,190	60,190
9-86	K	3	4	4	CEILING	729	199765	97,711	97,711
9-87	J	3	16	4	CEILING	168	199764	40,869	40,869
9-88	J	3	11	12	CEILING	478	199765	44,666	44,666
9-89	J	5	17	13	CEILING	166	199764	39,234	39,234
9-90	J	4	11	11	CEILING	389	199765	35,382	35,382
9-91	J	5	15	5	CEILING	95	15158	11,269	11,269
9-92	J	5	18	17	CEILING	175	199764	18,886	18,886
9-93	J	6	14	6	CEILING	79	15158	11,269	11,269
9-94	J	6	15	14	CEILING	136	15158	27,499	27,499
9-95	J	6	8	18	CEILING	146	199764	18,886	18,886
9-96	J	6	8	8	CEILING	134	199764	18,886	18,886
9-97	J	5	5	15	CEILING	212	199764	29,071	29,071
9-98	J	5	4	1	CEILING	113	15158	15,336	15,336
9-99	J	4	4	11	CEILING	378	199765	35,382	35,382
9-100	J	5	17	4	CEILING	125	199764	20,644	20,644
9-101	J	3	9	13	CEILING	203	199764	69,477	69,477
9-102	J	3	5	4	CEILING	175	199764	46,591	46,591
9-103	H	6	16	4	CEILING	607	199765	44,666	44,666
9-104	H	3	17	15	CEILING	729	199765	97,711	97,711
9-105	H	5	17	17	CEILING	236	199765	81,296	81,296
9-106	H	4	16	11	CEILING	431	199765	40,648	40,648
9-107	H	5	3	17	CEILING	78	15158	11,269	11,269
9-108	H	5	15	15	CEILING	192	199764	29,071	29,071
9-109	H	6	17	2	CEILING	61	15158	11,269	11,269
9-110	H	6	16	16	CEILING	50	15158	11,269	11,269
9-111	H	6	1	19	CEILING	91	15158	11,269	11,269
9-112	H	6	9	9	CEILING	119	199764	18,886	18,886

Survey Unit 776009 Follow-up Nal data
(Ceiling)

Location #	Column letter	Column Number	North	East	Elevation	Gross Counts	Probe Serial #	In-process dpm/100cm ²	Follow-up dpm/100cm ²
9-113	H	5	9	18	CEILING	160	199764	218,404	18,886
9-114	H	5	5	1	CEILING	268	15158	97,303	97,303
9-115	H	4	1	15	CEILING	314	199765	35,382	35,382
9-116	H	5	15	4	CEILING	253	199765	94,585	94,585
9-117	H	3	17	4	CEILING	274	199765	44,666	44,666
9-118	H	3	3	4	CEILING	417	199765	44,666	44,666
9-119	G	2	15	6	CEILING	434	199765	44,666	44,666
9-120	G	2	17	17	CEILING	343	199765	44,666	44,666
9-121	G	3	15	8	CEILING	148	199764	24,521	24,521
9-122	G	3	16	13	CEILING	266	199765	44,666	44,666
9-123	G	4	13	3	CEILING	140	199765	35,382	35,382
9-124	G	4	17	12	CEILING	154	199765	35,382	35,382
9-125	G	5	13	5	CEILING	113	15158	15,336	15,336
9-126	G	5	15	15	CEILING	77	15158	11,269	11,269
9-127	G	6	15	15	CEILING	60	15158	11,269	11,269
9-128	G	6	15	15	CEILING	55	15158	11,269	11,269
9-129	G	6	12	15	CEILING	152	199764	29,071	29,071
9-130	G	6	5	5	CEILING	121	15158	19,566	19,566
9-131	G	5	15	5	CEILING	172	15158	46,536	46,536
9-132	G	5	15	5	CEILING	116	15158	16,922	16,922
9-133	G	4	3	17	CEILING	79	199765	35,382	35,382
9-134	G	4	8	4	CEILING	109	199765	35,382	35,382
9-135	G	3	10	12	CEILING	269	199765	44,666	44,666
9-136	G	3	3	9	CEILING	240	199765	44,666	44,666
9-137	G	2	5	16	CEILING	195	199765	44,666	44,666
9-138	G	2	5	16	CEILING	195	199765	44,666	44,666
9-139	H	2	15	5	CEILING	949	199764	57,767	57,767
9-140	H	2	5	15	CEILING	530	199764	57,767	57,767
9-141	H	2	15	15	CEILING	360	199764	197,806	197,806
9-142	H	2	15	5	CEILING	949	199764	57,767	57,767
9-143	J	2	5	5	CEILING	334	199764	176,554	176,554
9-144	J	2	5	15	CEILING	474	199764	290,987	290,987
9-145	J	2	15	15	CEILING	566	199764	366,186	366,186
9-146	J	2	16	5	CEILING	378	199764	212,518	212,518
9-147	K	2	3	5	CEILING	562	199764	362,916	362,916
9-148	K	2	3	15	CEILING	488	199764	302,430	302,430
9-149	K	3	16	12	CEILING	186	199765	42,211	42,211
9-150	K	3	1	17	CEILING	165	199765	25,796	25,796

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Unit 776009

Wall 4

Section A

Date 11/30/04

Column #	2,136,291	1,711,902	2,245,109								Column #
K3	462,476	121,183									K2
ELEV. (ft)	ON CONTACT	ON CONTACT									Row Average #DIV/0! Row Average 2,031,100
12	161,623	191,960									Row Average 291,830
9	144,886	157,439									Row Average 176,792
6	107,334	34,129									Row Average 151,162
3	ON CONTACT	ON CONTACT									Row Average 70,732
0	115,248	52,925									Row Average 84,086
	ON CONTACT	ON CONTACT									

Probe# 1	212344	Background 1	73
Efficiency 1	240	RCT 1	MEREZKO
Contact Eff. 1	0.0870		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920		

Section Average
305,014

dpm/100cm²

Count Time (s) 30

B

Unit 776009

Wall 6

Section A

Date 12/6/04

Column #																98,431	119,205	Column #
L2																		L3
ELEV. (ft)																		
12																36,108		Row Average #DIV/0! Row Average 108,818
																ON CONTACT		Row Average 36,108
9																28,194		Row Average 28,194
																ON CONTACT		Row Average 80,624
6																80,624		Row Average 80,624
																ON CONTACT		Row Average 32,151
3																32,151		Row Average 32,151
																ON CONTACT		Row Average 38,086
0																38,086		Row Average 38,086
																ON CONTACT		

Probe# 1	212344	Background 1	124
Efficiency 1	240	RCT 1	MEREZKO
Contact Eff. 1	0.0870		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920		

Section Average
48,295

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 6

Section B

Date 12/6/04

Column #	164,239	129,717	121,348	136,086	124,487	126,579	120,302	110,887	117,164	108,795	104,611	121,348	152,731	Column #
L3	254,745	191,808	239,760	173,826	178,322	203,796								L4
ELEV. (ft)														
12	197,802	163,337	404,110	320,023	288,232	194,805								
9	224,775	107,334	42,043	295,205	242,757	194,805								
6	7,419	11,376	11,376	8,409	20,280	3,791								
3	212,360	148,547	163,193	131,809	116,118	115,072								
0														

Probe# 1 212344
 Background 1 124
 Efficiency 1 240
 RCT 1 MERZKO
 Contact Eff. 1 0.0870

Probe# 2 199764
 Background 2 207
 Efficiency 2 280
 RCT 2 LANFORD
 Contact Eff. 2 0.0920

Section Average
 158,742
 dpm/100cm²
 Count Time (s) 30

Row Average 147,850

Row Average 10,442

Row Average 184,486

Row Average 258,051

Row Average 207,043

Row Average 126,176

#DIV/0!

Unit 776009

Wall 6

Section C

Date 12/6/04

Column #	165,285	187,253	191,437	222,821	188,299	175,746	166,331	147,501	133,902	129,717	186,207	146,455	186,207	Column #
L4	223,277	191,808	208,292	179,820	209,790	202,298	L5							
ELEV. (ft)														
12	235,265	218,781	215,784	199,301	217,283	185,814	Row Average 202,547							
9	248,751	224,775	185,814	181,319	197,802	188,811	Row Average 212,038							
6	173,826	188,811	197,802	184,316	202,298	193,307	Row Average 204,545							
3	3,791	3,791	3,791	32,151	33,140	20,280	Row Average 190,060							
0	ON CONTACT	Row Average 16,157												

Probe# 1	212344	Background 1	124
Efficiency 1	240	RCT 1	MEREZKO
Contact Eff. 1	0.0870		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920	ON CONTACT 1/15/05	

Section Average
165,569

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 6

Section D

Date 1/9/05

Column #						Column #
L5						L6
ELEV. (ft)						
12	81,561	131,654	84,130	102,112	95,690	129,085
9	111,103	117,525	134,223	113,672	114,956	127,801
6	131,654	145,783	21,269 <small>ON CONTACT</small>	19,290 <small>ON CONTACT</small>	220,280	145,783
3	19,290 <small>ON CONTACT</small>	18,301 <small>ON CONTACT</small>	3,791 <small>ON CONTACT</small>	17,312 <small>ON CONTACT</small>	3,791 <small>ON CONTACT</small>	3,791 <small>ON CONTACT</small>
0						

Row Average #DIV/0!

Row Average #DIV/0!

Row Average #DIV/0!

Row Average 104,039

Row Average 119,880

Row Average 114,010

Row Average 11,046

Probe# 1	199764	Background 1	109
Efficiency 1	280	RCT 1	WATT
Contact Eff. 1	0.0920		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920		

Section Average
87,244

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 6

Section E

Date 1/7/05

Column #	29,183	26,215	15,333	67,764								60,839	Column #
L6													L7
ELEV. (ft)													
12	114,956	91,837	85,415										
9	108,534	86,699	138,076										
6	174,040	156,058	153,489										
3	29,183	26,215	15,333	67,764	244,789	60,839							
0	ON CONTACT	ON CONTACT	ON CONTACT		ON CONTACT	ON CONTACT							

Row Average #DIV/0!
Row Average 39,867

Row Average #DIV/0!

Row Average 97,403

Row Average 111,103

Row Average 161,196

Row Average 74,021

Probe# 1	199764	Background 1	109
Efficiency 1	280	RCT 1	WATT
Contact Eff. 1	0.0920		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920	ON CONTACT	1/15/01

Section Average 98,454

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 14

Section A

Date 12/18/04

Column #							Column #
G7				62,509	72,784	64,221	G6
ELEV. (ft)							
12				88,197	74,497	125,874	
9				172,113	131,012	211,503	
6				31,683			
3				3,791			
0				ON CONTACT			

Row Average
#DIV/0!
Row Average
#DIV/0!

Row Average
66,505

Row Average
96,189

Row Average
171,543

Row Average
31,683

Row Average
3,791

Probe# 1	15156	Background 1	161
Efficiency 1	210	RCT 1	CIMINO
Contact Eff. 1	0.0790		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920	ON CONTACT VIEW	

Section Average
94,380

dpm/100cm²

Count Time (s) 30

20

Unit 776009

Wall 14

Section C

Date 11/29/04

Column #	160,577	179,407	165,808	151,162	146,978	132,332	120,825	158,485	89,442	156,393	150,116	162,670	196,145	202,422	Column #
G3															G4
ELEV. (ft)															
12	222,527	267,482	198,551	215,035	188,062										
9	219,530	173,077	222,527	212,038	213,536	210,539									
6	212,038	131,119	231,518	185,065	234,515	245,005									
3	191,059	222,527	177,572	209,041	219,530	231,518									
0	3,791 <small>ON CONTACT</small>														

Row Average
#DIV/0!
Row Average
155,197

Row Average
218,331

Row Average
208,541

Row Average
206,543

Row Average
208,541

Row Average
3,791

Probe# 1	212344	Background 1	95
Efficiency 1	240	RCT 1	MEREZKO
Contact Eff. 1	0.0870		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920		

Section Average
166,473

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 14

Section E

Date 11/29/04

Column #	74,689	60,839	39,075	71,721	87,549	52,925	137,011	123,162	67,764	55,893	81,613	73,699	155,807	17,312	13,355	Column #
G3												31,161	47,979	22,258	400,153	G2
ELEV. (ft)	74,689 ON CONTACT	60,839 ON CONTACT	39,075 ON CONTACT	71,721 ON CONTACT	87,549 ON CONTACT	52,925 ON CONTACT	137,011 ON CONTACT	123,162 ON CONTACT	67,764 ON CONTACT	55,893 ON CONTACT	81,613 ON CONTACT	73,699 ON CONTACT	155,807 ON CONTACT	17,312 ON CONTACT	13,355 ON CONTACT	
12	234,515	222,527	245,005	137,011 ON CONTACT	123,162 ON CONTACT	67,764 ON CONTACT										
9	255,494	225,524	198,551	252,497	55,893 ON CONTACT	81,613 ON CONTACT										
6	237,512	261,488	237,512	227,023	73,699 ON CONTACT	155,807 ON CONTACT										
3	17,312 ON CONTACT	13,355 ON CONTACT	31,161 ON CONTACT	47,979 ON CONTACT	22,258 ON CONTACT	400,153 ON CONTACT										
0																

Row Average

74,161

Row Average

125,388

Row Average

64,466

Row Average

171,664

Row Average

178,262

Row Average

198,840

Row Average

88,703

Probe# 1	212344	Background 1	95
Efficiency 1	240	RCT 1	MEREZKO
Contact Eff. 1	0.0870		

Probe# 2	199764	Background 2	207
Efficiency 2	280	RCT 2	LANFORD
Contact Eff. 2	0.0920		

Section Average
137,138

dpm/100cm²

Count Time (s) 30

Unit 776009

Wall 15

Section A

Date 12/18/04

Column #						4,458	4,458	4,458	4,458	Column #
ELEV. (ft)										
12						127,587		28,257		
9						47,096		31,683		
6										
3										
0										

Row Average #DIV/0! 4,458

Row Average 77,922

Row Average 39,389

Row Average #DIV/0!

Row Average #DIV/0!

Row Average #DIV/0!

Section Average 54,320

dpm/100cm²

Count Time (s) 30

Probe# 1 15156 Background 1 161
 Efficiency 1 210 RCT 1 CIMINO
 Contact Eff. 1 0.0790

Probe# 2 Background 2
 Efficiency 2 RCT 2
 Contact Eff. 2

Total Surface Activity

Survey Area:		V	Survey Unit:		776009			
Meter Model:		NE Electra w/ DP6 Probe				Dates Counted:		
Instrument #:		1427	1277	1253	n/a	n/a	A priori MDA:	94
Cal. Due Date:		2/28/05	1/23/05	1/31/05	n/a	n/a	Avg. Local Bkgd	4.0
Efficiency (c/d):		20.100	24.000	21.900	n/a	n/a	Avg. Efficiency	22.000
Sample Location #	RCT ID #	Inst. #	Instrument (cpm)	Local Bkgd (cpm)	(dpm/100 cm ²)			
1	510391	1253	5	6.0	0.0			
2	510391	1253	9	8.0	0.0			
3	513090	1277	12	3.0	0.4			
4	513090	1277	16	5.0	0.5			
5	516676	1427	6	1.0	0.2			
6	516676	1277	54	3.0	2.3			
7	516676	1427	26	3.0	1.0			
8	516676	1427	98	3.0	4.3			
9	516676	1427	10800	2.0	490.8			
10	513090	1277	6	4.0	0.1			
11	513090	1277	6	6.0	0.0			
12	516676	1427	5	2.0	0.1			
13	516676	1427	97	2.0	4.3			
14	513090	1277	3	5.0	-0.1			
15	516676	1427	6	2.0	0.2			
16	516676	1427	6	1.0	0.2			
17	513090	1277	14	5.0	0.4			
18	516676	1427	3	2.0	0.0			
19	513090	1277	74	2.0	3.3			
20	513090	1277	7	5.0	0.1			
21	513090	1277	7	2.0	0.2			
22	513090	1277	30	4.0	1.2			
23	513090	1277	30	10.0	0.9			
24	513090	1277	39	9.0	1.4			
25	513090	1277	15	9.0	0.3			
26	516676	1427	583	4.0	26.3			
27	516676	1427	18	2.0	0.7			
28	516676	1427	41	3.0	1.7			
29	516676	1427	2	4.0	-0.1			
30	516676	1427	10	3.0	0.3			
					MIN	-0.1		
					MAX	490.8		
					MEAN	18.0		
					SD	89.4		

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Removable Activity

Survey Area:		V	Survey Unit:		776009
Dates Counted:	12/14/04				
A priori MDA:	16				
Efficiency (c/d)	0.333				
Smear Location Number	Smear Results				
	RCT ID #	Serial Number	Gross (cpm)	Bkg.	(dpm/100 cm ²)
1	516701	847	1	0.3	2
2	516701	847	0	0.3	-1
3	516676	1479	2	0.0	6
4	516676	847	0	0.2	-1
5	516676	1051	2	0.4	5
6	516676	847	0	0.2	-1
7	516676	1051	5	0.4	14
8	516676	847	6	0.2	17
9	516676	847	2	0.2	5
10	516676	816	3	0.4	8
11	516676	1479	1	0.0	3
12	516676	816	1	0.4	2
13	516676	1479	1	0.0	3
14	516676	816	4	0.4	11
15	516676	1051	0	0.4	-1
16	516676	1479	0	0.0	0
17	516676	847	0	0.2	0
18	516676	1479	0	0.0	0
19	516676	816	0	0.4	0
20	516676	1051	0	0.4	0
21	516676	1479	0	0.0	0
22	516676	816	0	0.4	0
23	516676	847	0	0.2	0
24	516676	847	0	0.2	0
25	516676	1051	0	0.4	0
26	516676	1051	0	0.4	0
27	516676	847	0	0.2	0
28	516676	1051	0	0.4	0
29	516676	1479	0	0.0	0
30	516676	816	0	0.4	0
				MIN	-1.2
				MAX	17.4
				MEAN	2.4
				SD	4.6

Sample Location Number	Nal Activity Measurements				
	Measurement Used	Comment	Surface	Coating	(dpm/100 cm ²)
1	Sodium Iodide	N/A	ceiling	thin/no paint	5,308
2	Sodium Iodide	N/A	ceiling	thin/no paint	6,216
3	Sodium Iodide	N/A	ceiling	thin/no paint	15,855
4	Sodium Iodide	N/A	ceiling	thin/no paint	18,859
5	Sodium Iodide	N/A	ceiling	thin/no paint	10,989
6	Sodium Iodide	N/A	ceiling	thin/no paint	20,139
7	Sodium Iodide	N/A	wall	thin/no paint	9,196
8	Sodium Iodide	N/A	wall	thin/no paint	12,805
9	Sodium Iodide	N/A	ceiling	thin/no paint	122,721
10	Sodium Iodide	N/A	ceiling	thin/no paint	16,693
11	Sodium Iodide	N/A	ceiling	thin/no paint	10,593
12	Sodium Iodide	N/A	ceiling	thin/no paint	7,637
13	Sodium Iodide	N/A	ceiling	thin/no paint	15,203
14	Sodium Iodide	N/A	ceiling	thin/no paint	23,748
15	Sodium Iodide	N/A	ceiling	thin/no paint	12,852
16	Sodium Iodide	N/A	ceiling	thin/no paint	47,798
17	Sodium Iodide	N/A	wall	thin/no paint	1,642
18	Sodium Iodide	N/A	wall	thin/no paint	1,642
19	Sodium Iodide	N/A	ceiling	thin/no paint	262,903
20	Sodium Iodide	N/A	ceiling	thin/no paint	18,183
21	Sodium Iodide	N/A	ceiling	thin/no paint	14,854
22	Sodium Iodide	N/A	wall	thin/no paint	1,642
23	Sodium Iodide	N/A	wall	thin/no paint	6,775
24	Sodium Iodide	N/A	wall	thin/no paint	6,426
25	Sodium Iodide	N/A	wall	thin/no paint	32,712
26	Sodium Iodide	N/A	wall	thin/no paint	728,827
27	Sodium Iodide	N/A	wall	thin/no paint	30,127
28	Sodium Iodide	N/A	wall	thin/no paint	22,770
29	Sodium Iodide	N/A	ceiling	thin/no paint	17,112
30	Sodium Iodide	N/A	ceiling	thin/no paint	19,208
				MIN	1,642
				MAX	728,827
				AVERAGE	50,715
				SD	137,359

Data and Sodium Iodide Instrument Information

Survey Area:	V	Survey Unit:	776009	Survey Date(s):	12/15/04
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Instrument Specifications

Instrument #	1	2
Meter Model:	Ludlum 2350-1	Ludlum 2350-1
Meter Serial #:	203449	201199
Detector Model:	Bicron G-5	Ludlum 44-17
Detector #:	B940T	199764
Detector Size (cm ²):	125	17.8
Calibration Due Date:	6/8/05	6/9/05
Count Time (min)	5	5
Contact Efficiency	5.60%	9.20%

Ratio Used

Pu to Am - 241	8.1
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Comments

In cases where the critical level is greater than the calculated dpm/100cm², the critical level will be used for statistical analysis.

Count Times for backgrounds and samples are equal.

Attenuation Factors: Based on observation of Walls and Ceilings. Epoxy on Floor determined by chip sampling.

Background (Gross)

Instrument #	1	2
Gamma (Ceilings)	441	N/A
Gamma (Floors)	N/A	N/A
Gamma (Block Walls)	919	N/A
Gamma (Solid Walls)	N/A	N/A

Background (cpm)

Instrument #	1	2
Gamma (Ceilings)	88.2	N/A
Gamma (Floors)	N/A	N/A
Gamma (Block Walls)	183.8	N/A
Gamma (Metal Walls)	N/A	N/A

Efficiencies (cpm/dpm)

Instrument #	1	2
Thin/No Paint	0.056	0.091
Epoxy	0.045	0.074
Other	0.053	0.087

Coatings

	Thickness (inches)
Thin/No Paint	0.007
Epoxy	0.250
Other	0.06

Total Activity Estimates Using Sodium Iodide Instruments

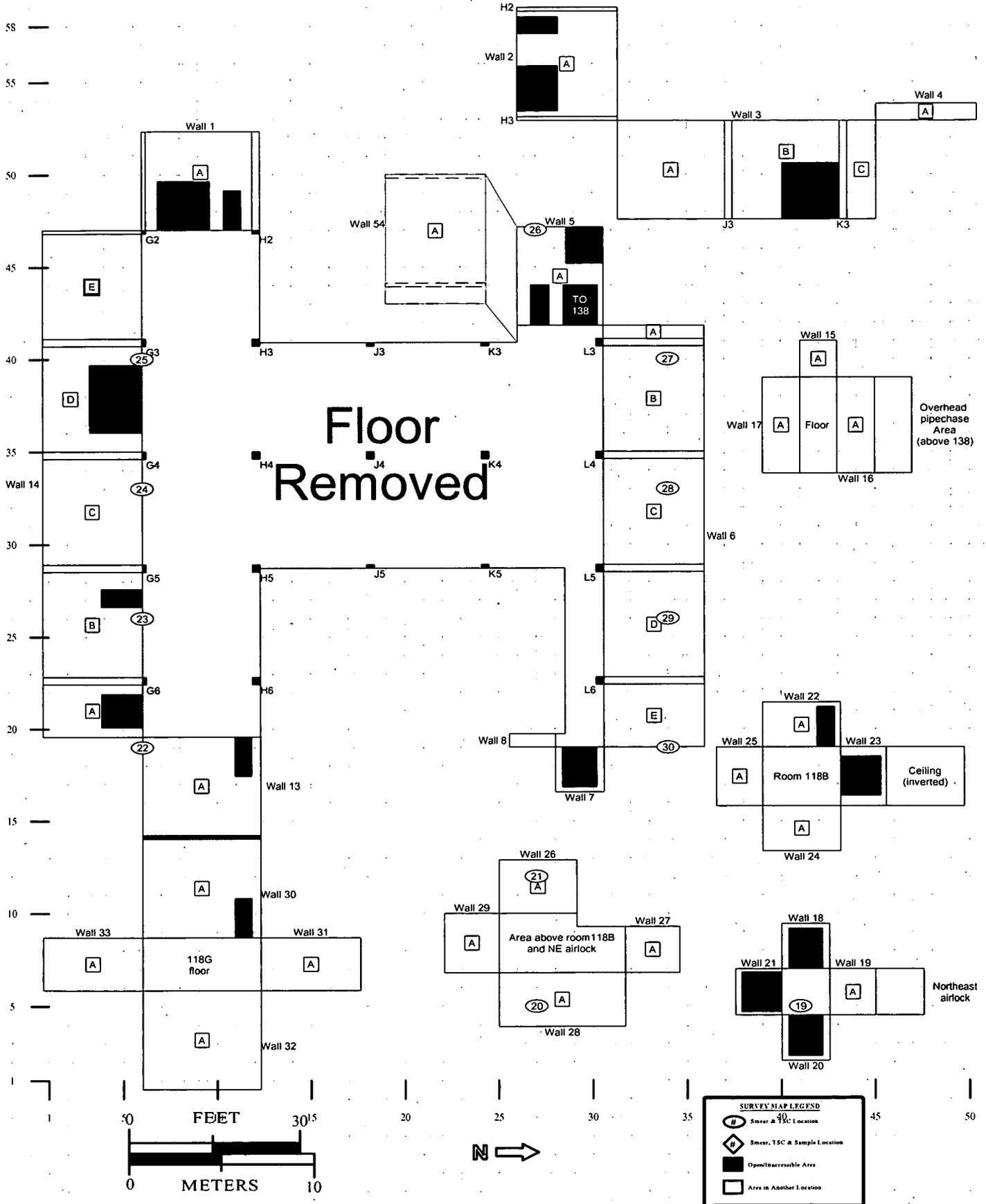
Survey Area:	V	Survey Unit:	776009	Survey Date(s):	12/15/04
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Sample Location #	RCT ID #	Instrument #	Gross Counts	Critical Level (dpm/cm2)	Total Alpha (dpm/cm2)
1	2	1	669	1,137	5,308
2	2	1	708	1,137	6,216
3	1	1	1,122	1,137	15,855
4	1	1	1,251	1,137	18,859
5	1	1	913	1,137	10,989
6	1	1	1,306	1,137	20,139
7	2	1	1,314	1,642	9,196
8	2	1	1,469	1,642	12,805
9	2	1	5,712	1,137	122,721
10	1	1	1,158	1,137	16,693
11	1	1	896	1,137	10,593
12	1	1	769	1,137	7,637
13	1	1	1,094	1,137	15,203
14	1	1	1,461	1,137	23,748
15	1	1	993	1,137	12,852
16	1	1	2,494	1,137	47,798
17	1	1	556	1,642	1,642
18	1	1	771	1,642	1,642
19	1	1	11,733	1,137	262,903
20	1	1	1,222	1,137	18,183
21	1	1	1,079	1,137	14,854
22	2	1	773	1,642	1,642
23	2	1	1,210	1,642	6,775
24	2	1	1,195	1,642	6,426
25	2	1	2,324	1,642	32,712
26	2	1	32,223	1,642	728,827
27	2	1	2,213	1,642	30,127
28	2	1	1,897	1,642	22,770
29	1	1	1,176	1,137	17,112
30	1	1	1,266	1,137	19,208

RADIOLOGICAL CLOSEOUT SURVEY FOR THE 776 CLUSTER

Survey Area: 5 Survey Unit: 776009 Classification: NA
 Building: 776
 Survey Unit Description: First floor area 5 unit 9
 Total Floor Area: NA Total Area: 1765 sq. m Grid Size: 7 x 7 sq.m

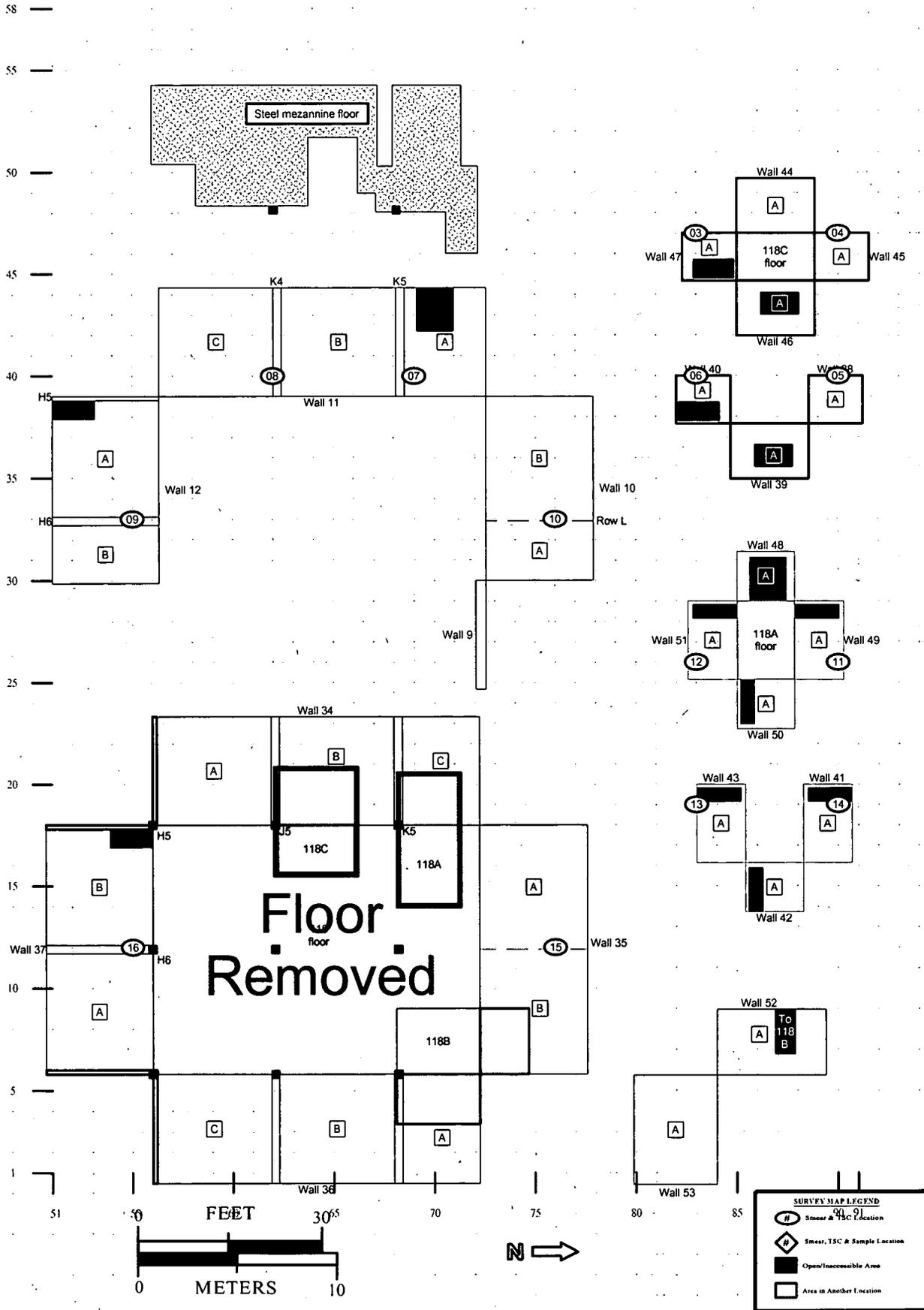
SURVEY UNIT 776009 - MAP 1 OF 3



RADIOLOGICAL CLOSEOUT SURVEY FOR THE 776 CLUSTER

Survey Area: 5 Survey Unit: 776009 Classification: NA
 Building: 776
 Survey Unit Description: First floor area 5 unit 9
 Total Floor Area: NA Total Area: 1765 sq. m Grid Size: 7 x 7 sq.m

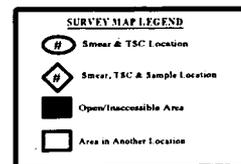
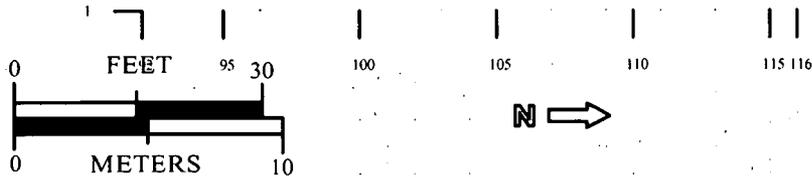
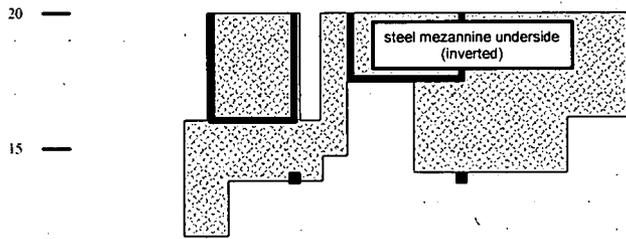
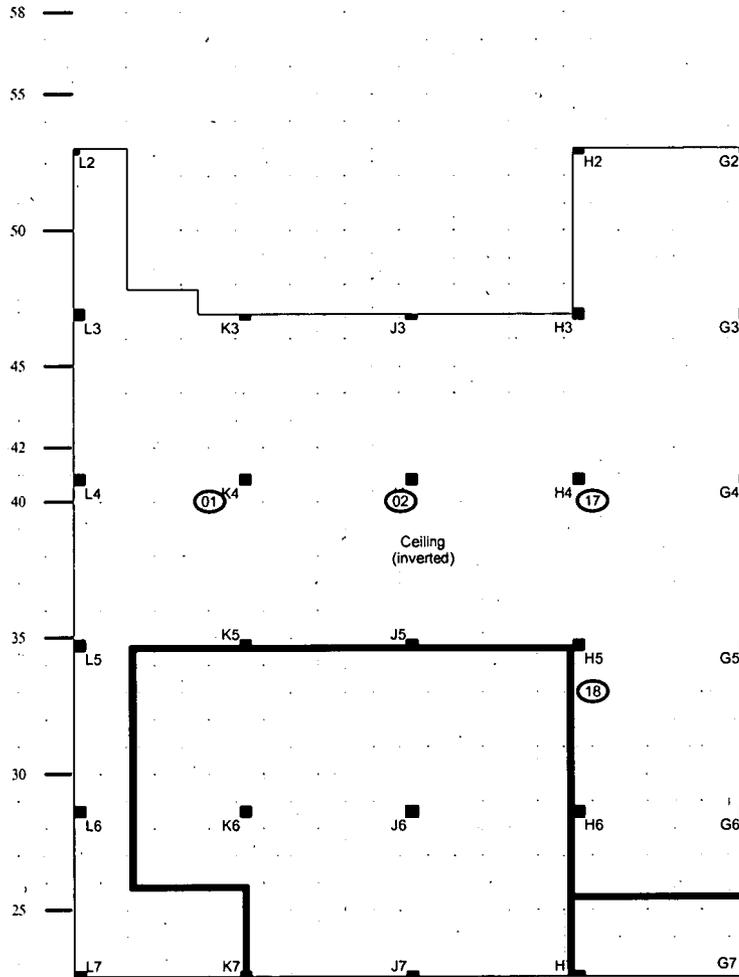
SURVEY UNIT 776009 - MAP 2 OF 3



RADIOLOGICAL CLOSEOUT SURVEY FOR THE 776 CLUSTER

Survey Area: 5 Survey Unit: 776009 Classification: NA
Building: 776
Survey Unit Description: First floor area 5 unit 9
Total Floor Area: NA Total Area: 1765 sq. m Grid Size: 7 x 7 sq.m

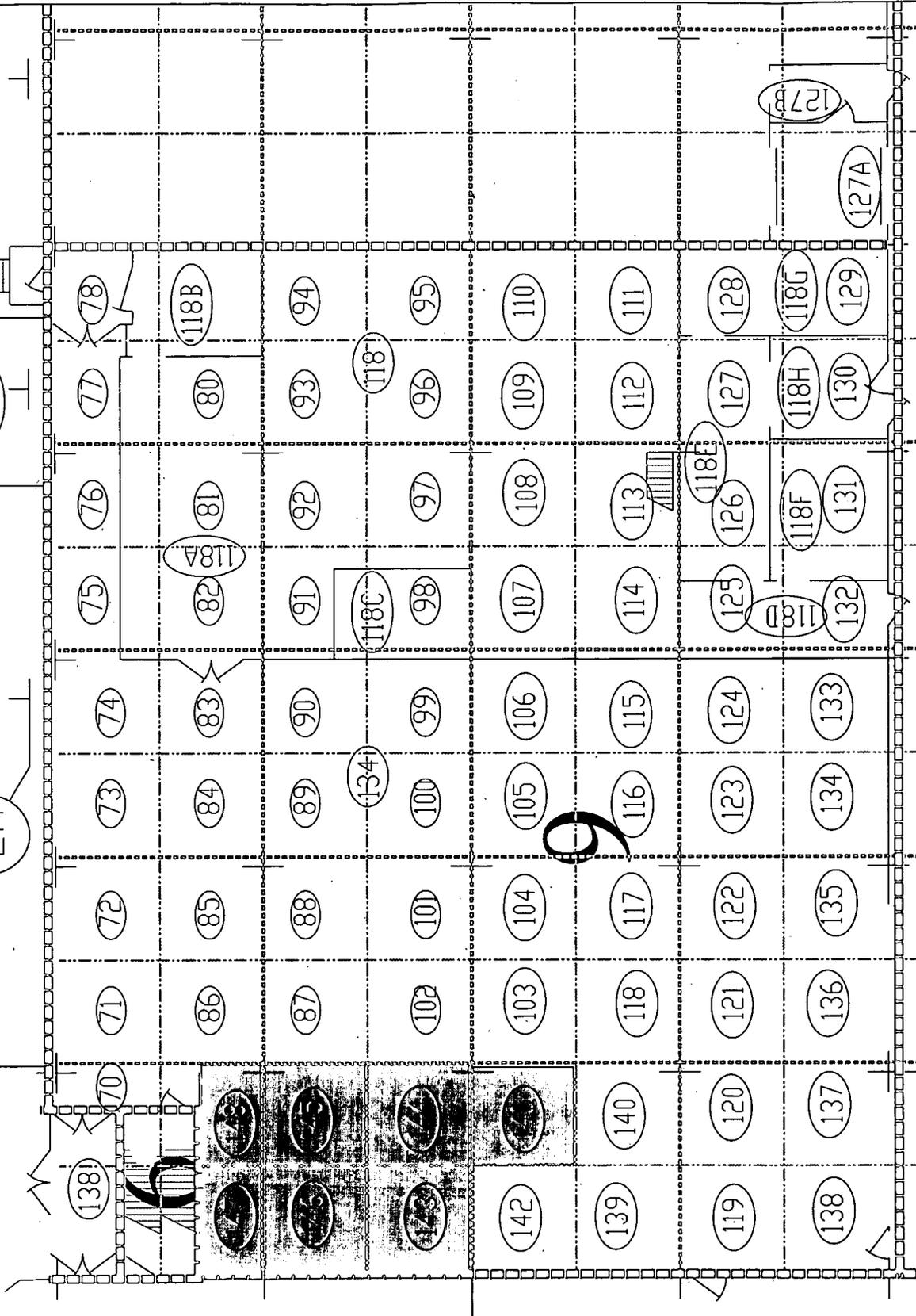
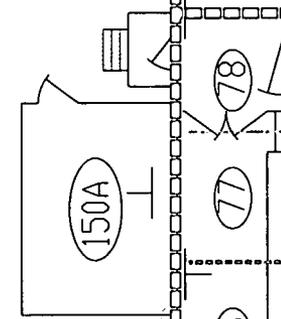
SURVEY UNIT 776009 - MAP 3 OF 3



776009
Elevated
Ceiling Areas

RAMP

LA



Attachment 1

Standard Method for Calculating the ASCV for Each Survey Unit

Prerequisites:

1. Final survey map for the survey unit
2. PDS survey results
3. Survey information used to estimate activities in inaccessible areas;
4. Survey information for any structural members or elevated regions not represented by the PDS survey.

Conversions:

1 square meter (m²) = 100 x 100 cm²

1 microcurie (μCi) = 2.22x 10⁶ dpm

1 (μCi/ m²) = 22,200 dpm/ 100cm² evenly distributed over one square meter.

12 inches = 1 foot = 0.305 meters

Calculations:

Accessible Area Inventory

1. Calculate the average surface contamination for the applicable survey unit from a minimum of 30 sodium iodide measurements obtained by the PDS survey.
2. Average the total surface contamination activity present.
3. Convert the average surface contamination value from step 2 from "dpm/ 100cm²" to "μCi/ m²"

Example:

$$22,200 \text{ dpm}/100\text{cm}^2 \times (100 \times 100 \text{ cm}^2/ \text{m}^2) \times (1\mu\text{Ci}/2.22 \times 10^6 \text{ dpm}) = 1 \mu\text{Ci}/ \text{m}^2$$

4. Obtain surface area of survey unit from title box of final survey map. This is reported in square meters.
5. Calculate inventory for accessible areas

The surface area from a survey unit map title box is 1,000 square meters and the average contamination level from the 30 PDS points is 22,200 dpm/ 100cm².

Example:

$$1,000 \text{ m}^2 \times 22,200 \text{ dpm}/ 100\text{cm}^2 \times (100 \times 100 \text{ cm}^2/ \text{m}^2) \times (1\mu\text{Ci}/2.22 \times 10^6 \text{ dpm}) = 1,000 \mu\text{Ci}$$

Inaccessible Area Inventory

1. Document methods used to estimate contamination levels and potential inventory in seams, cracks or other surfaces in the final survey report. Provide an estimated remaining inventory for each item/area in the report.

Example:

There are 20 feet of seams contaminated to an average level of 2,220,000 dpm/100 cm². Each seam has two sides. The total inventory can be estimated assuming the contamination levels measured at the top of the seam extend down each side of the seam. The depth of the seam can be determined from design drawings or from direct observation as the seam is chipped away. If a seam is determined to be 4 inches deep, then the inventory of the seam can be calculated as follows:

The contaminated area of the seam is:

$$(20 \text{ feet} \times .305 \text{ m/ft}) \times (0.3 \text{ feet} \times 0.305 \text{ m/ft}) = .61 \text{ m}^2 \times 2 \text{ sides} = 1.22 \text{ m}^2$$

Therefore the inventory in the seam in μCi is:

$$1.22 \text{ m}^2 \times (2,220,000 \text{ dpm}/100 \text{ cm}^2) \times (10,000 \text{ cm}^2/ \text{m}^2) \times \mu\text{Ci} / 2.22 \times 10^6 \text{ dpm} = 122 \mu\text{Ci}$$

Attachment 1

Calculating the ASCV

1. Sum the inventories from the inaccessible areas with the inventory for the accessible area to obtain a total inventory for the survey unit.

Total Inventory = Accessible Inventory + Inaccessible inventory + Inventory items (areas not represented by other inventories listed i.e. Stairs, columns, etc)

Example: 1000 μCi = accessible inventory

122 μCi = inaccessible inventory

100 μCi = inaccessible contamination in the columns and contamination on the stairs

$$1000 + 122 + 100 = 1222 \mu\text{Ci}$$

2. Divide the total inventory for the survey unit by the accessible area of the survey unit obtained from the final survey map.

Example: 1222 μCi = total inventory

1000 m^2 = total surface area of the survey unit

$$1222 \mu\text{Ci} / 1,000 \text{ m}^2 = 1.22 \mu\text{Ci} / \text{m}^2$$

$$1.22 \mu\text{Ci} / \text{m}^2 \cdot (1 \text{ m}^2 / (100 \cdot 100 \text{ cm}^2)) \cdot (2.22 \text{E}6 \text{ dpm} / \mu\text{Ci}) = 27084 \text{ dpm} / 100 \text{ cm}^2$$