Rocky Flats Environmental Technology Site

Building 776/777 1st Floor Final Survey Report

Survey Unit: 776039

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January 2005

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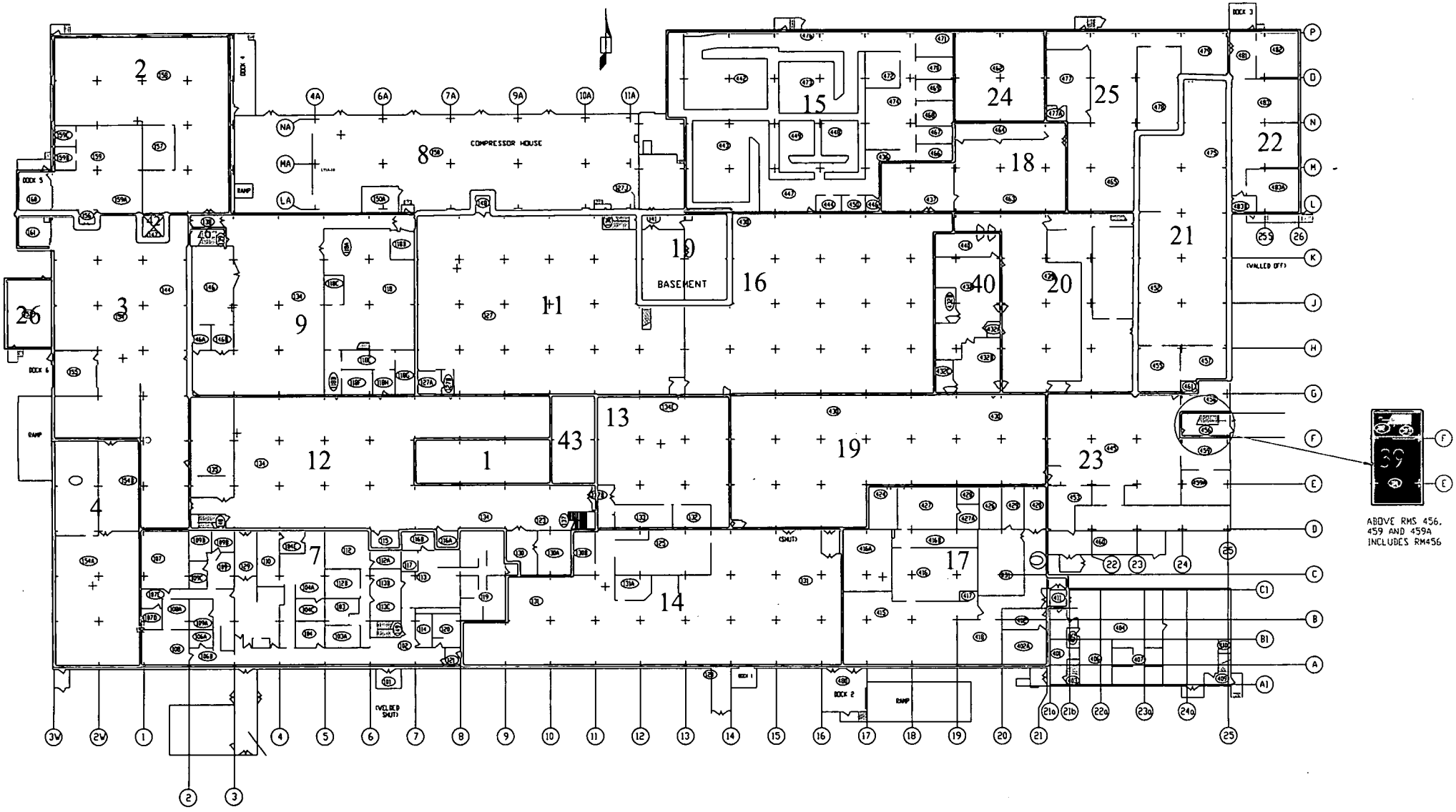
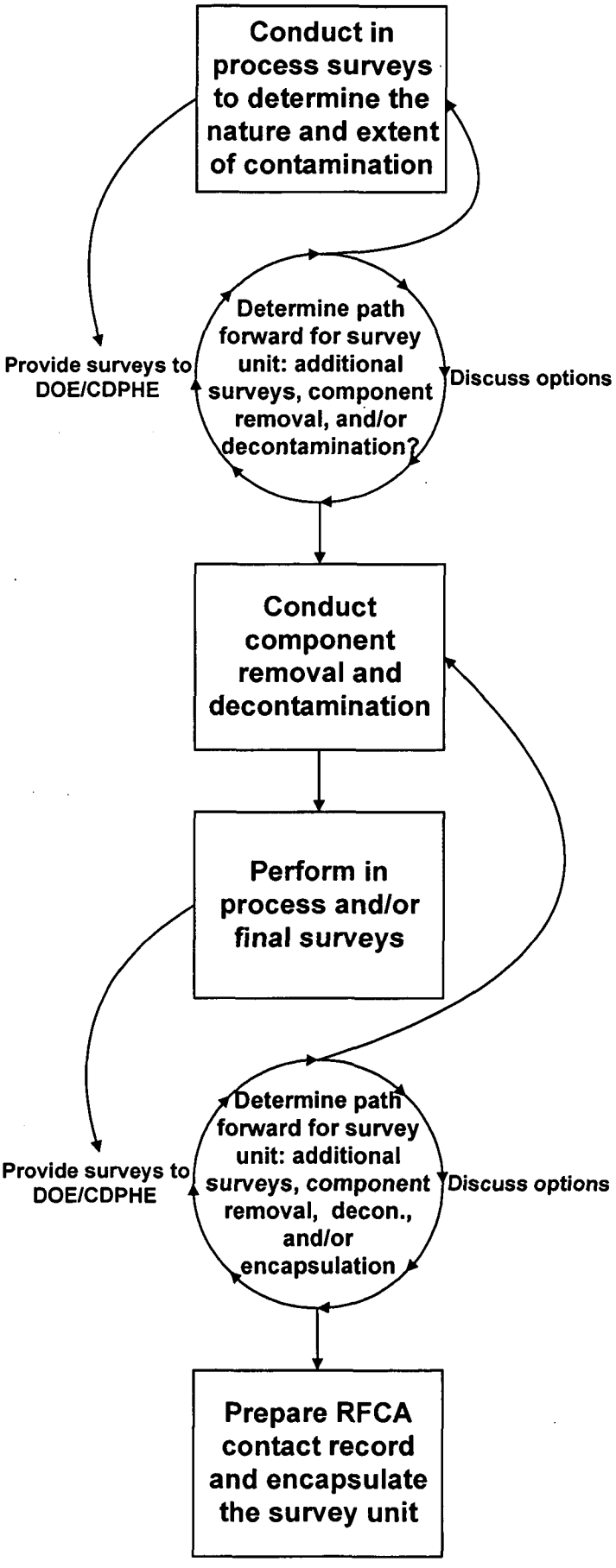
B776/777 SURVEY UNITS
1st FLOOR




Conduct in process surveys to determine the nature and extent of contamination
Determine path forward for survey unit: additional surveys, component removal, and/or decontamination?
Provide surveys to DOE/CDPHE
Discuss options
Conduct component removal and decontamination
Perform in process and/or final surveys
Determine path forward for survey unit: additional surveys, component removal, decon., and/or encapsulation
Provide surveys to DOE/CDPHE
Discuss options
Prepare RFCA contact record and encapsulate the survey unit

Survey Instructions

Purpose:

This instruction provides guidance for collecting gross gamma and removable contamination data for quantifying the amount of residual contamination in Survey Unit 39 prior to demolition. Work to be 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 Bicron G-5 Attached to a Ludlum 2350-1 set to collect five-minute counts that will be displayed on its LCD window.

3) HILTI PD 28 Laser range finder or Measuring tape that is at least 10 feet long.

4) 2 Probe holders, one for the G-5 and one for the 44-17 with tin side shields.

5) Calibrated and daily response checked SAC-4.

Procedure:

Note: The Bicron G-5 FIDLER detector is the preferred probe and should be used unles the randomly selected sample location is in an area that is not accessible by the G-5 or when areas like the ceiling and upper portions of the walls make use of the probe difficult.

1) RCT, ensure the instrument is functioning by using Americium-241 source RS-912.

2) RCT, inspect instrument for obvious damage and perform a battery check on the instrument.

3) RCT, obtain a 300 second background measurement on a " clean" Cinderblock brick place in the center of room 301.

4) One NaI measurement and one swipe for removable contamination will be taken on floors, walls and ceilings as indicated on the attached map.

5) RCT, turn on audible response, place detector in holder 30 cm from the Floor. Scan an area 3 feet around each sample location. Listen for a change in count rate. Note at any point where count rate noticeably higher and a reading at this location as well as at the sample location.

7) RCT, take all measurements on contact with the surfaces marked on the map. All readings should have 300 second count times.

8) RCT, record the NaI measurement on the attached sheet. Note any items or conditions that may have affected the measurement in the "remarks" column.

9) Count swipes for 120 seconds with a SAC-4, record result on Attached sheet for removable contamination.

Survey Instructions

Purpose:

This instruction provides guidance for performing the final removable contamination surveys in survey unit 39 that are to be performed after the area has been encapsulated.

Equipment and materials:

1) Calibrated and daily response checked SAC-4.

2) Nineteen 47 mm swipes.

Procedure:

1) Ensure final encapsulation verification form is complete.

2) Collect one swipe for removable contamination on floors, walls and ceilings as indicated on the attached map. The locations on this map are the same as those used for the final survey performed prior to encapsulation. At least 19 locations will be surveyed.

3) Count swipes for 120 seconds with a SAC-4, record result on Attached sheet for removable contamination.

4) Record results of Survey on attached sheet for post encapsulation removable contamination survey.

Equations and Definitions

Areal Efficiency (S_a) - The relationship between counts per minute recorded on an instrument and the activity per square meter on the surface that is being measured. This term is used when a detector has been calibrated to measure uniformly distributed contamination spread over an area that is much larger than the detector's active area.

During the B776/777 in -process surveys, the units used for S_a are "cpm/microcurie/square meter". The Sa is used to convert net counts per minute into an activity value. As an example, if an instrument is calibrated so that its S_a is 150 cpm/uCi/m2, then a measurement of 300 net counts on that instrument correlates to 300/150 or 2 microcuries per square meter.

Microcurie per square meter- equates to 22,200 dpm/100cm2.

Picocurie (pCi)- one trillionth of a curie. One picocurie is equal to 2.22 dpm. The total activity release limit of 100 dpm/100cm2 equals 45-pCi/100 cm2.

Converting Instrument Readings to Activity

For Readings taken on Contact:

$$\text{Activity per 100cm2} = \frac{CPM}{efficiency - for - Am - 241} \times {}^{100cm2}\!/_{\text{Probe} - area(cm)} \times 8.1$$

$$\text{Activity of Point source} = \frac{CPM}{efficiency - for - Am241} \times 8.1$$

The value of 8.1 is the correction factor between americium 241 and total alpha contamination in 34-year-old weapons grade plutonium. Point source equation assumes contaminated area is smaller than the surface area of the probe.

Critical Level: The level at which there is a 5% chance of calling a background value "greater than background". The term is normally used to describe the number of counts above a measured background count that would be sufficient to be considered above background. In this report the critical level is reported as an activity by applying the appropriate correction factors to the counts. (See NUREG -1575, Section 6.7.1 for greater detail)

The formula used to calculate the critical level for Survey unit 39 is:

$$Critical\ Level = \frac{1.645\sqrt{\frac{Rb}{Tb}+\frac{Rb}{Ts}}}{(Efficiency)x(A)}\ X\ PuCF\ X\ 100$$

Where: Rb = Background Count rate (cpm)
Tb = Background count time (min)
Ts = Sample Count time (min)
$Efficiency$ = Detector Efficiency for Am-241 in decimal form(unitless)
A = Active Detector Area (cm2)
$PuCF$ = Ratio between Am-241 and total alpha , 8.1 for 34 year old WgPu

Minimum Detectable Activity: The level of activity that the detector can be expected to detect 95% of the time. The factors used to calculate the Minimum Detectable Activity (MDA) for this report were selected to ensure that areas with no contamination would be identified as contaminated less than 5% of the time.

The formula used for calculating MDA in this report is:

$$MDA = \frac{2.71+3.29\sqrt{\frac{Rb}{Tb}+\frac{Rb}{Ts}}}{(Efficiency)x(A)x(Af)}\ X\ \ PuCF\ X\ 100$$

Where: MDA = Minimum Detectable Activity(dpm/cm^2)
Rb = Background Count rate (cpm)
Tb = Background count time (min)
Ts = Sample Count time (min)
$Efficiency$ = Detector Efficiency for Am-241 in decimal form(unitless)
A = Active Detector Area (cm2)
Af = Attenuation correction factor (unitless)
$PuCF$ = Ratio between Am-241 and total alpha , 8.1 for 34 year old WgPu

FINAL SURVEY REPORT
Survey Unit 776039

Scope

This survey unit was completed and closed out and a contact record was written and presented to the DOE and CDPHE on December 8, 2003 (See the attached original data summary and contact record). This report is prepared to summarize the in-process and final surveys of survey unit 776039 previously performed, and put the results into a format consistent with recent final survey reports.

Survey Unit 776039 consists of rooms 301, 302, 303, a stairway and room 456 in Building 777. The area can only be accessed through the doorway in room 456 and meets all requirements for being selected as a unique survey unit. The area has had all equipment and floor tiles removed. Early surveys indicated the need to remove remnants of ductwork and the walls surrounding them. Upon completion of these actions, the attached survey was conducted in accordance with the characterization plan for B776/777.

Historical Review

The rooms in this survey unit were process areas. The building surfaces in survey unit 776039 were contaminated in numerous locations from the smoke from the fire that occurred in 1969, as well as the spread of contamination from routine operations that occurred throughout the life of the building.

In-process Survey Methods and Techniques

Surfaces were evaluated for potential contamination using sodium iodide (NaI) detectors attached to single channel analyzers windowed for the 59 keV gamma–ray (241Am).

Measurements were taken at 30 cm. and on contact. For the 30-cm. measurements on the floors and ceilings, the survey technique involved scanning each grid location to find the highest reading and then taking the measurement at that point. For the 30-cm. measurements on the walls, the reading was taken at the center of each grid; this provides 100% coverage of the walls.

Survey measurements on floors, and ceilings were taken on an established 5ft by 5ft grid pattern.

ALARA Post-Remediation Surveys

Accessible Areas

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 dose to the workers ALARA.

Floors

The floors of survey unit 776039 consist of epoxy covered concrete. The average of the in-process floor measurements collected was 32,766 dpm/100 cm^2, with no single measurement >60,000 dpm/100 cm^2. Therefore, no floor remediation was required.

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Walls

Survey measurements on the walls of survey unit 776039 were taken on an established 3-ft. by 3-ft. grid on each of the wall sections within the survey unit. The average contamination on all of the walls was <100,000 dpm/100cm^2. Some of the walls showed contamination values >100,000 dpm/100cm^2 on the upper portions of the cinder block walls. This activity was attributed to contamination from the 1969 fire. The highly contaminated blocks were removed. Follow-up survey results showed the average of all sections of the wall were <100,000 dpm/100cm^2. Removal of the contaminated blocks on the walls resulted in a decontamination factor (DF) of 2.4 or a source term reduction of 57.5%.

Table 1

Wall Remediation Results

	Pre-Remediation	Post-Remediation
Maximum (dpm/100cm^2)	111,945	52,515
Average (dpm/100cm^2)	73,331	31,177

Ceilings

Survey measurements revealed that all accessible ceiling surfaces in the survey unit are <100,000 dpm/100cm^2.

Inaccessible Areas

Walls

Approximately 11 m^2 of the interior wall surfaces was found to have the same contamination levels as the rest of the survey unit. Therefore an estimated 9.7 µCi of contamination in the wall is inaccessible (300 µCi*11 m^2 / 341 m^2 = 9.7 µCi).

Floors/Ceilings

The inaccessible areas of the floor and ceilings have the same or less potential for contamination as the accessible areas of the floors and ceilings of survey unit 776039 and therefore were not evaluated.

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 to determine whether the building may be demolished within the limits outlined in the "Radiological Pre-Demolition Survey Plan Building 776/777".

Because this survey unit was one of the 1st survey units developed, the standard thirty survey measurements were not obtained. Instead, a statistically valid quantity of nineteen survey measurements was obtained for this survey unit. A random start, systematic grid method was used to identify the survey point locations. Two types of surveys are performed at each survey point as follows:

- 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}).

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- 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 determine the effectiveness of encapsulation following the PDS.

PDS Data Summary

In accordance with the "Radiological Pre-Demolition Survey Plan Building 776/777" the final survey total surface contamination values are used to determine the $ASCV_u$ for each survey unit. No appreciable inaccessible contamination exists in this survey unit. Therefore, the total source term for the survey unit is equal to the accessible area source term. The results are summarized in Table 2 below (See Attachment 1 for calculation guidance):

Table 2:

PDS Final Results

	Final Results
776039 Inaccessible Area Source Term (μCi)	9.7
776039 Accessible Area Source Term (μCi)	300
776039 Total Source Term (μCi)	309.7
Survey Unit Wall, Ceiling, and Floor Area (m^2)	341
($ASCV_u$) (μCi/m^2)	0.91
($ASCV_u$) (dpm/100cm^2)	19,504

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 (m^2) = 100 x 100 cm^2

1 microcurie (μCi) = 2.22x 10^6 dpm

1 ($\mu Ci/ m^2$) = 22,200 dpm/ 100cm^2 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/ 100cm^2" to "$\mu Ci/ m^2$"

   Example:

   22,200 dpm/100cm^2 x (100 x 100 cm^2/ m^2) x (1μCi/2.22x 10^6 dpm) = 1 $\mu Ci/ m^2$
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/ 100cm^2.

   Example:

   1,000 m^2 x 22,200 dpm/ 100cm^2 x (100 x 100 cm^2/ m^2) x (1μCi/2.22x 10^6 dpm) = 1,000 μCi

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 cm^2. 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 feet x .305 m/ft) * (0.3 feet x 0.305 m/ft) = .61 m^2 x 2 sides = 1.22 m^2

   Therefore the inventory in the seam in μCi is:

   1.22 m^2 * (2,220,000 dpm/100 cm^2) * (10,000 cm^2/ m^{-2})* μCi /2.22E6 dpm = 122 μCi

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 μCi

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 m2 = total surface area of the survey unit

   1222 μCi/1,000 m^2 = 1.22 μCi / m^2

   1.22 μCi /m^2 * (1m^2 /(100*100 cm^2)) * (2.22E6 dpm/μCi) = 27084 dpm/ 100cm^2

Survey Unit 39 Data Summary

Survey Unit 39 consists of rooms 301, 302, 303, a stairway and room 456 in Building 777. The area can only be accessed through the doorway in room 456 and meets all requirements for being selected as a unique survey unit. The area has had all equipment and floor tiles removed. Early surveys indicated the need to remove remnants of ductwork and the walls surrounding them. Upon completion of these actions, the attached survey was conducted in accordance with the characterization plan for B776/777.

A total of 19 survey points were selected using a random start grid sampling method. At each location a contact reading was taken with a sodium iodide detector in accordance with TBD-0193 "Use of the LUDLUM 2350-1 Data logger with the Ludlum 44-17 or G-5 "FIDLER" Detector". A smear was taken at each location as well to determine the removable contamination levels. Summaries of the data are presented in Table 1. The total surface activity data used the critical level as the lowest value for total surface activity instead of values generated when measurements were near or below the measured background measurement.

Table 1

Total Surface Activity Measurements			Removable Activity Measurements		
	15 Number Required	19 Number Obtained		15 Number Required	19 Number Obtained
MIN	3831.5	dpm/100 cm^2	MIN	-1.2	dpm/100 cm^2
MAX	52515.5	dpm/100 cm^2	MAX	104.8	dpm/100 cm^2
MEAN	19504.3	dpm/100 cm^2	MEAN	25.3	dpm/100 cm^2
STD DEV	15386.6	dpm/100 cm^2	STD DEV	33.2	dpm/100 cm^2

Previous surveys found contamination inside the cinderblock along the west wall of room 301 at levels similar to those reported here. The highest level known to exist inside the west wall is 12,000 dpm /100cm^2. Because this is below the average value calculated for the survey unit, contamination inside the west wall is assumed to be at the same levels as the remainder of the survey unit. The internal surface area of the west wall is estimated to be 11.15 square meters. This value will be added to the area of the survey unit and multiplied by the average contamination level to obtain a total activity for the survey unit.

A scan of the top surface of the remaining portion of west wall found 3 highly localized hotspots which are accounted for on a separate sheet in addition to the average value obtained from the randomly selected survey locations. The levels at these locations are

46,405, 80,284 and 109,511 dpm per probe area. The values obtained for these areas will be added to the total activity of the survey unit as point sources. The remainder of the wall is at levels similar to the survey unit average.

Recommendations:

Additional decontamination will not significantly reduce the level of residual contamination in the survey unit. This survey unit is ready for encapsulation and isolation.

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE
REGULATORY CONTACT RECORD

Date/Time: December 8, 2003

Site Contact(s): Dyan Foss
Phone: (303) 966-7577

Regulatory Contact: Edd Kray
Phone: (303) 966-2115

Agency: CDPHE

Purpose of Contact: Survey Unit 39 Disposition

Discussion: In accordance with the 776/777 DOP, Appendix I, the preparation of the facility for demolition is conducted in consultation with the CDPHE and is based on a series of decisions primarily related to maintaining releases to the environment and doses to the workers as low as reasonably achievable (ALARA). This contact record documents the activities that were conducted to prepare Survey Unit 39 for demolition. Survey Unit 39 is in Area 2 and consists of Rooms 301, 302, 303, and 456.

In addition to the radiological hazards, the non-radiological hazards have also been addressed in Survey Unit 39. The following summarizes the non-radiological activities:

- The ancillary equipment (piping and the floor below the piping) associated with Resource Conservation and Recovery Act (RCRA) unit 776.2 have been removed in accordance with the DOP.
- Chemicals and hazardous substances have been removed.
- Beryllium regulated and controlled areas have been closed. This area was designated a beryllium regulated area in the 1990s because some beryllium parts were found in a desk drawer. However, the area was de-posted once the Chronic Beryllium Disease Protection Program was developed because the area did not meet the criteria. Samples were taken in the area to verify that the unit was below the release criteria.
- Polychlorinated biphenyls (PCB) hazards and equipment have been removed
- Asbestos has been abated.

Based on the survey results and the principles of ALARA, the risks (industrial and radiological) to the workers are greater than the benefit in source term reduction, which would be gained through additional decontamination. The state project representative agrees that decontamination inside Survey Unit 39 has progressed to the point of

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reasonably achievable removal and that the subsequent step of fixative application is now appropriate.

In summary, ALARA-based decontamination has been completed, Survey Unit 39 will be encapsulated and surveyed for removable contamination, and controls will be applied during demolition. This contact record will be included as an appendix to the characterization report for Survey Unit 39.

Contact Record Prepared by: Dyan Foss

Required Distribution:

P. Arnold, K-H
C. Deck, K-H
T. Dieter, K-H 707/776/777
C. Gilbreath, K-H 771
S. Gunderson, CDPHE
D. Shelton, K-H
L. Kilpatrick, DOE RFFO
J. Legare, DOE RFFO
R. Leitner, K-H 371
J. Mead, K-H ESS
S. Nesta, K-H RISS
K. North, K-H ESS/MS
T. Rehder, USEPA

Additional Distribution:

J. Hindman, CDPHE
E. Kray, CDPHE
G. Schuetz, DOE RFFO
J. Thompson, K-H 707/776/777
H. Brown, 707/776/777
V. Pizzuto, K-H 707/776/777
B. Kury, K-H 707/776/777

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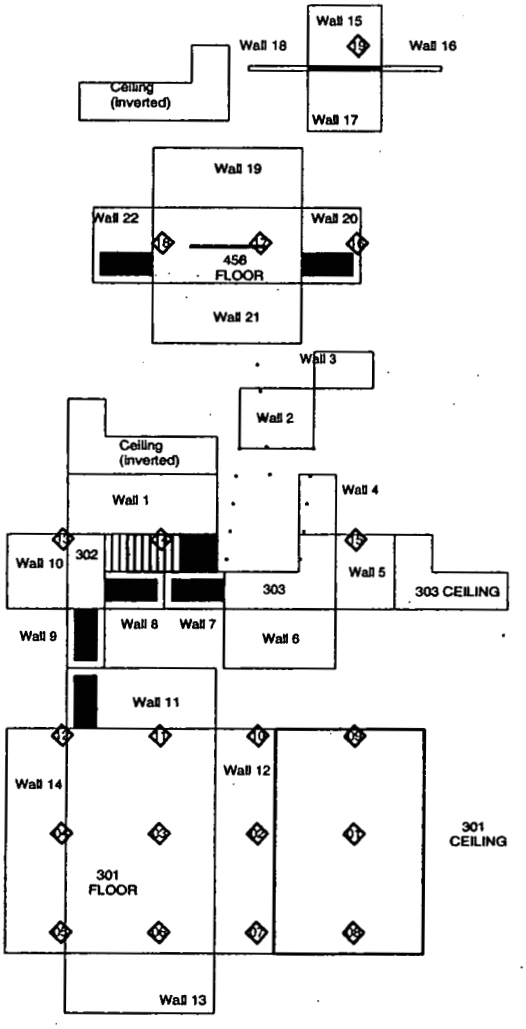
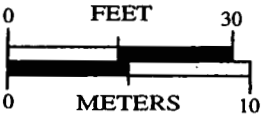
RADIOLOGICAL CLOSEOUT SURVEY FOR THE 776 CLUSTER

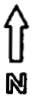
Survey Area: 2 **Survey Unit: 776039** **Classification: NA**
Building: 776
Survey Unit Description: Secret Rooms 301, 302, 303, 456

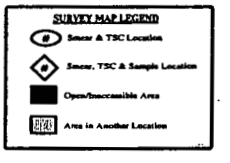
Total Floor Area: 83 sq. m **Total Area: 341 sq. m** **Grid Size: 4m x 4m**

SURVEY UNIT 776039 - MAP 1 OF 1









Sample Location Number	NaI Activity Measurements				
	Comment		Surface	Coating	(dpm/100 cm^2)
1	N/A	N/A	Ceiling	Paint	7,124
2	N/A	N/A	Wall	Paint	52,515
3	N/A	N/A	Floor	Paint	12,222
4	N/A	N/A	Wall	Paint	25,701
5	N/A	N/A	Wall	Paint	41,214
6	N/A	N/A	Floor	Paint	9,889
7	N/A	N/A	Wall	Paint	10,856
8	N/A	N/A	Ceiling	Paint	7,124
9	N/A	N/A	Ceiling	Paint	7,124
10	N/A	N/A	Wall	Paint	16,014
11	N/A	N/A	Floor	Paint	3,832
12	N/A	N/A	Wall	Paint	40,045
13	N/A	N/A	Wall	Paint	31,157
14	N/A	N/A	Floor	Paint	3,832
15	N/A	N/A	Wall	Paint	32,437
16	N/A	N/A	Wall	Paint	29,969
17	N/A	N/A	Floor	Paint	3,832
18	N/A	N/A	Floor	Paint	3,832
19	N/A	N/A	Wall	Paint	31,862
				MIN	3,832
				MAX	52,515
				AVERAGE	19,504
				SD	15,386

Floors

	Type	Serial Number	Efficiency on Contact	Cal Due
Instrument	Ludlum 2350-1	193699	N/A	3/11/04
Detector	Bicron G-5	B980V	7.20%	3/11/04
HV = 600	Threshold= 10mV	Window= 2.4mV	Source check =Sat.	

Gross BKG Cts	Counttime (min)	BKG Countrate	Americium MDA	Total Alpha MDA
5,493	5.0	1,099	953	7,723
			Critical level	Critical level
			473	3,832
Attenuation Correction	.25" epoxy equivilent	0.81	Corrected efficiency	0.058
Probe Area(cm2)	125.0			

Sample Number	Gross Counts	Net Counts per minute	Americium DPM/100cm2	Total Alpha DPM/ 100cm2
3	6,043	110	1,509	12,222
6	5,938	89	1,221	9,889
11*	5,493	0	0	3,832
14*	5,493	0	0	3,832
17	5,569	15	209	3,832
18	5,493	0	0	3,832

Average for Floors
6,240

*Sample count less than background

Walls

	Type	Serial Number	Efficiency on Contact	Cal Due
Instrument	Ludlum 2350-1	193699	N/A	3/11/04
Detector	Bicron G-5	B980V	7.20%	3/11/04
HV = 600	Threshold= 10mV	Window= 2.4mV	Source check =Sat.	

Gross BKG Cts	Counttime(min)	BKG Countrate	Americium MDA	Total Alpha MDA
3,213	5.0	3,213	1,357	10,994
			Critical level	Critical level
			676	5,472

Attenuation Correction	.035" epoxy equivilent	0.97	Corrected efficiency	0.070
Probe Area(cm2)	125.0			

Sample Number	Gross Counts	Net Counts per minute	Americium DPM/100cm2	Total Alpha DPM/ 100cm2
2	6,043.0	566	6,483	52,515
4	4,598.0	277	3,173	25,701
5	5,434.0	444	5,088	41,214
7	3,798.0	117	1,340	10,856
10	4,076.0	173	1,977	16,014
12	5,371.0	432	4,944	40,045
13	4,892.0	336	3,847	31,157
15	4,961.0	350	4,005	32,437
16	4,828.0	323	3,700	29,969
19	4,930.0	343	3,934	31,862

Average for walls
31,177

Ceilings

	Type	Serial Number	Efficiency on Contact	Cal Due
Instrument	Ludlum 2350-1	193699	N/A	3/11/04
Detector	Ludlum 44-17	199765	7.00%	3/11/04
HV = 850	Threshold= 10mV	Window= 2.4mV	Source check =Sat.	

Gross BKG Cts	Counttime (min)	BKG Countrate	Americium MDA	Total Alpha MDA
522	5.0	104	1,804	14,612
			Critical level	Critical level
			880	7,124

Attenuation Correction	.035" epoxy equivilent	0.97	Corrected efficiency	0.068
Probe Area(cm2)	17.8			

Sample Number	Gross Counts	Net Counts	Americium DPM/100cm2	Total Alpha DPM/ 100cm2
1*	480.0	-42	-3,475	7,124
8*	420.0	-102	-8,439	7,124
9*	471.0	-51	-4,220	7,124

* Sample count less than background

Average for Ceiling
7,124

Removable Activity

Survey Area:		2	Survey Unit:		776039
Dates Counted:	12/2/03				
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	2	953	0	0.2	-1
2	1	956	1	0.3	2
3	1	953	1	0.2	1
4	1	956	1	0.3	2
5	1	953	0	0.2	-1
6	1	956	2	0.3	4
7	1	953	0	0.2	-1
8	2	956	3	0.3	7
9	2	953	0	0.2	-1
10	1	956	0	0.3	-1
11	1	953	0	0.2	-1
12	1	956	1	0.3	2
13	1	953	0	0.2	-1
14	1	956	0	0.3	-1
15	1	953	0	0.2	-1
16	1	956	0	0.3	-1
17	1	953	0	0.2	-1
18	1	956	0	0.3	-1
19	1	953	0	0.2	-1
				MIN	-0.9
				MAX	**6.6**
				MEAN	**0.4**
				SD	2.0