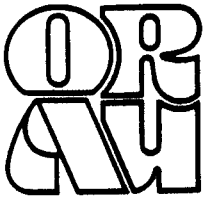

Prepared by
Oak Ridge Associated
Universities

Prepared for
U.S. Nuclear
Regulatory
Commission's
Region V Office

Supported by
Safeguards and
Materials Program
Branch;
Division of
Quality Assurance,
Safeguards, and
Inspection Programs;
Office of
Inspection and
Enforcement

RADIOLOGICAL SURVEY OF BUILDING 004 ENERGY SYSTEMS GROUP, HEADQUARTERS ROCKWELL INTERNATIONAL CANOGA PARK, CALIFORNIA

L. L. SOWELL

Radiological Site Assessment Program
Manpower Education, Research, and Training Division

FINAL REPORT

January 1985

RADIOLOGICAL SURVEY OF BUILDING 004 ENERGY SYSTEMS GROUP, HEADQUARTERS ROCKWELL INTERNATIONAL CANOGA PARK, CALIFORNIA

Prepared for

U. S. Nuclear Regulatory Commission
Region V Office

Supported By:
Safeguards and Materials Program Branch
Division of Quality Assurance, Safeguards, and Inspection Programs
Office of Inspection and Enforcement
and
Division of Fuel Cycle and Material Safety

L. L. SOWELL

Project Staff

J. D. Berger
R. D. Condra
K. E. Paulson
T. J. Sowell
B. C. Williams
B. S. Zacharek
C. F. Weaver

Prepared by

Radiological Site Assessment Program
Manpower Education, Research, and Training Division
Oak Ridge Associated Universities
Oak Ridge, Tennessee 37831-0117

FINAL REPORT

January 1985

This report is based on work performed under Interagency Agreement DOE No. 40-816-83 NRC Fin. No. A-9076 between the U.S. Nuclear Regulatory Commission and the U.S. Department of Energy. Oak Ridge Associated Universities performs complementary work under contract number DE-AC05-760R00033 with the U.S. Department of Energy.

TABLE OF CONTENTS

	Page
List of Figures	ii
List of Tables	iii
Introduction	1
Site Description	2
Survey Procedures	2
Results	4
Summary	5
References	22

Appendices

Appendix A: Major Sampling and Analytical Equipment

Appendix B: Analytical Procedures

Appendix C: Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material

Appendix D: Contamination Survey Summary Sheets

LIST OF FIGURES

		Page
FIGURE 1:	Map of Southwestern California Indicating the Location of ESG Headquarters	7
FIGURE 2:	Plan View of ESG Headquarters Indicating Location of Building 004	8
FIGURE 3:	Building 004 First Floor Plan Indicating Location of the Emission Spectrometer Lab (10) and the X-ray Diffraction Lab (11)	9
FIGURE 4:	Building 004 Second Floor Plan Indicating Location of Hot Chemistry Area (1-9)	10
FIGURE 5:	Grid System - Emission Spectrometer Lab (10)	11
FIGURE 6:	Grid System - X-ray Diffraction Lab (11)	12
FIGURE 7:	Grid System - Hot Chemistry Area (1-9)	13

LIST OF TABLES

		Page
TABLE 1:	Summary of Survey Results - Floors, Walls, and Ceilings	14
TABLE 2:	Summary of Survey Results - Drains, Pipes, Ledges, Etc.	16
TABLE 3:	Results of Roof Smears	19
TABLE 4:	Results of Paint Sample Analysis	20
TABLE 5:	Contamination Levels Measured at Locations Identified by the Surface Scans	21

RADIOLOGICAL SURVEY OF BUILDING 004 ENERGY SYSTEMS GROUP, HEADQUARTERS ROCKWELL INTERNATIONAL CANOGA PARK, CALIFORNIA

INTRODUCTION

The Headquarters of Energy Systems Group, Rockwell International, is located at 8900 DeSoto Avenue, Canoga Park, California. Three areas in Building 004 were used during the ATR Fuel Fabrication Program for analysis of enriched uranium in reactor fuel. These areas have been decontaminated to permit their release from the Nuclear Regulatory Commission (NRC) Special Nuclear Materials License No. SNM-21.

Decontamination efforts included the removal of contaminated exhaust systems, drain lines, tile, and most of the equipment. Floor, wall, and ceiling surfaces have been decontaminated and surveyed by the licensee. Equipment remaining in these areas will be covered under a state license for radioactive materials and was therefore not included in this decontamination process. The final survey of this facility by the licensee indicates no residual surface contamination in excess of the NRC guidelines for release for unrestricted use.[1]

Oak Ridge Associated Universities (ORAU), at the request of the NRC, Region V, conducted a confirmatory survey during the week of June 17, 1984, to provide data necessary to evaluate radiological conditions relative to decommissioning.

SITE DESCRIPTION

The Headquarters for Energy Systems Group, Rockwell International, is located at 8900 DeSoto Avenue, Canoga Park, California (refer to Figure 1). The areas to be surveyed are located in Building 004, and are the emission spectrometer lab, the X-ray diffraction lab, and the hot chemistry area. These locations are shown on Figures 2, 3, and 4 respectively. The emission spectrometer lab (Room 10) and the X-ray diffraction lab (Room 11), located on the first floor, are approximately 30 m^2 and 42 m^2 respectively. These rooms contained some equipment which, with the exception of one piece, was temporarily relocated to facilitate the survey. The hot chemistry area (Rooms 1-9) is located on the second floor and is approximately 325 m^2. This area was stripped completely and was free of obstructions. All of the rooms were of concrete and plaster construction.

SURVEY PROCEDURES

Objective

The objective of the survey was to verify the adequacy of the licensee's survey and confirm the radiological conditions relative to decommissioning criteria.

Procedures

1. Measurements were referenced to a 3 m grid system established by ORAU. This grid system is shown on Figures 5, 6, and 7.

2. A 100% beta-gamma scan of the floor areas and lower walls (up to 2 m) was performed. A 100% alpha scan was conducted on floor areas only. Locations of elevated contact radiation levels were noted.

3. A minimum of 10% of the grid blocks surveyed by the licensee were selected for replicate measurements. Additional grid blocks were selected based on information obtained during the beta-gamma and alpha scans, and at random such that at least 10% of the total floor and lower wall areas and 2% of the upper walls and ceiling were surveyed. Direct measurements of alpha and beta contamination were made at the center and four corners of each grid block selected. A smear for removable alpha and beta contamination was taken at the location of the maximum direct measurement in each grid block.

4. Gamma exposure measurements were performed at 1 m above the floor surface throughout each room.

5. Additional direct measurements, smears and paint samples were collected from walls, pipes, drains, ledges, etc.

Equipment, Analytical Procedures, and Interpretation of Results

Appendix A contains a list of the major equipment and instrumentation used for the survey. Analytical procedures are described in Appendix B. Survey results were compared to the NRC's Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct Source or Special Nuclear Material (see Appendix C). The alpha and beta-gamma contamination guidelines applicable to this site are:

Total - 5,000 dpm/100 cm^2, averaged over 1 m^2; 15,000 dpm/100 cm^2 maximum

Removable - 1,000 dpm/100 cm^2

RESULTS

Alpha and Beta-Gamma Surface Scans

Surface scans identified several small isolated floor locations with elevated direct radiation levels. Although the levels did not exceed the acceptable surface contamination guidelines, three of these areas were subsequently recleaned by the licensee. Elevated beta-gamma levels noted along the south wall of Room 10 were due to the presence of a 6,000 Ci Co-60 source in the adjacent room.

Total Contamination Level Measurements

Alpha and beta-gamma surface contamination levels on floors, walls, and ceilings are summarized in Table 1. Because the maximum levels were well below the NRC guidelines for both maximum and average levels, individual grid block averages are not tabulated. Instead, averages for all blocks in a specific category are provided. Information on individual blocks is presented in Appendix D. Average alpha and beta-gamma ranges were 20 - 230 dpm/100 cm^2 and <550 - 1,420 dpm/100 cm^2, respectively. The maximum alpha level was 1,860 dpm/100 cm^2 and the maximum beta-gamma level was 4,580 dpm/100 cm^2.

Beta-Gamma Dose Rates

Beta-gamma dose rates are summarized in Table 1. Both the maximum (0.108 mrad/h) and the averages, (0.010-0.033 mrad/h), are well within the NRC guidelines of 1.0 and 0.2 mrad/h, respectively.

Removable Contamination Levels

Table 1 presents the measurements of removable contamination. The maximum levels of removable alpha and beta-gamma contamination 14 dpm/100 cm^2 alpha and 15 dpm/100 cm^2 beta, were well within the NRC guidelines of 1,000 dpm/100 cm^2.

Gamma Exposure Rates

Gamma exposure rates at 1 m above the floor ranged from 9 μR/h to 15 μR/h.

Miscellaneous Measurements

Measurements performed on drains, pipes, air conditioning vents, and other ungridded surfaces are summarized in Table 2. No elevated contamination levels were noted on these surfaces.

A beta-gamma surface scan was conducted on the roof and smears were collected from two locations and three air conditioning vents. These results are tabulated in Table 3. No elevated radiation levels were noted.

The paint sample analysis results are tabulated in Table 4. There were no elevated contamination levels measured in these samples.

Before and after measurements at three locations of elevated contact radiation, subsequently decontaminated by the licensee, are presented in Table 5.

SUMMARY

At the request of the Nuclear Regulatory Commission, ORAU conducted radiological surveys of three areas in Building 004, at Rockwell International's Energy Systems site in Canoga Park, California. The purpose of the survey was to confirm the licensee's survey, which indicated that the facility satisfied NRC guidelines for release from licensing restrictions.

The ORAU survey included surface scans to identify contaminated areas, measurements of total and removable alpha and beta-gamma contamination levels, and measurements of gamma exposure rates. Small, isolated areas of contamination were identified by the surface scans. Although these areas did not exceed the applicable NRC limits, the licensee, following a conservative philosophy, chose to perform further decontamination at these locations. Cleaning was effective in reducing levels well below the limits. Total and removable contamination levels, measured on other facility surfaces, were also within these NRC guidelines.

It is ORAU's conclusion that the licensee's survey findings accurately represent the radiological status of the site, and that these areas are in compliance with the NRC guidelines for release for unrestricted use.

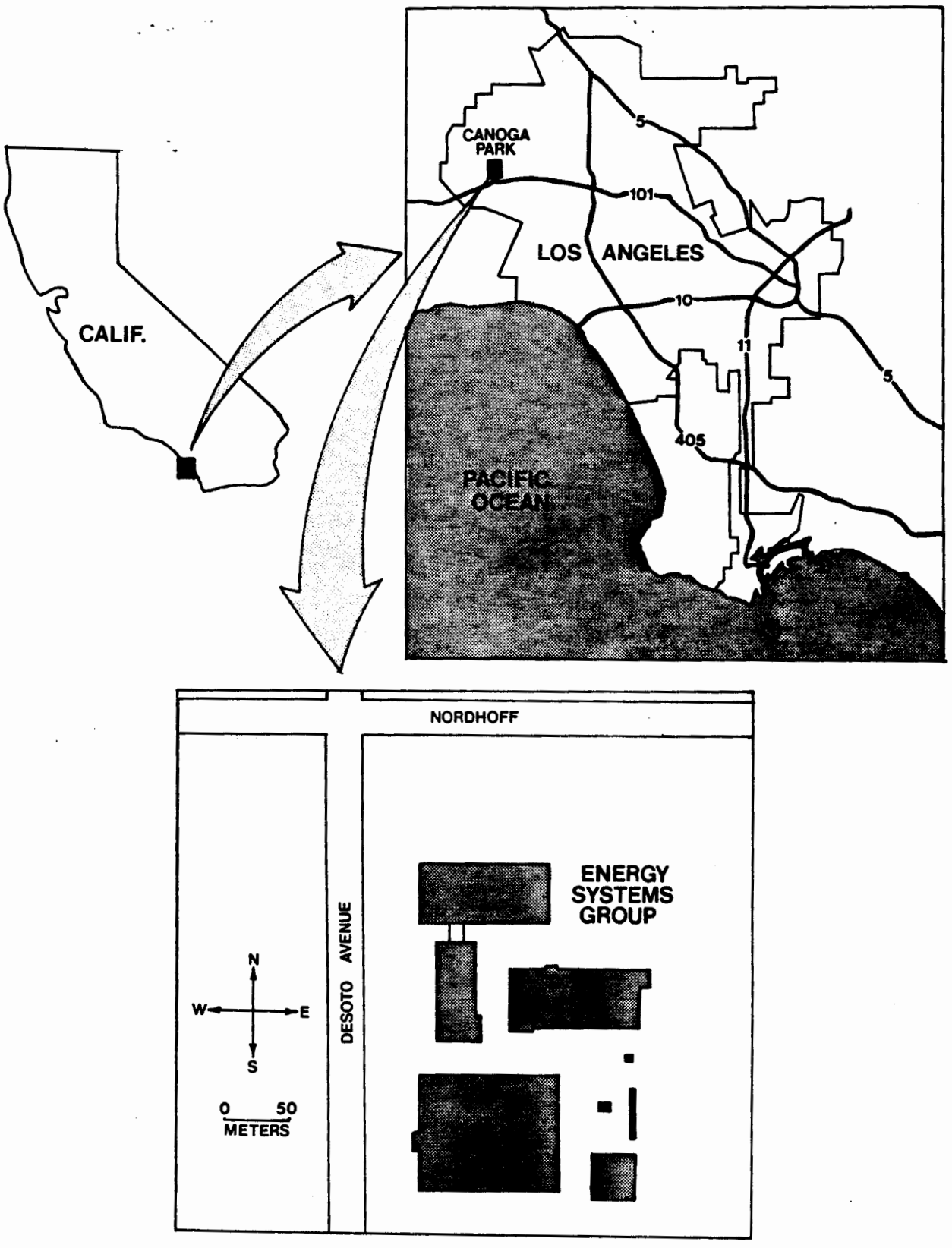

FIGURE 1: Map of Southwestern California Indicating the Location of ESG Headquarters.

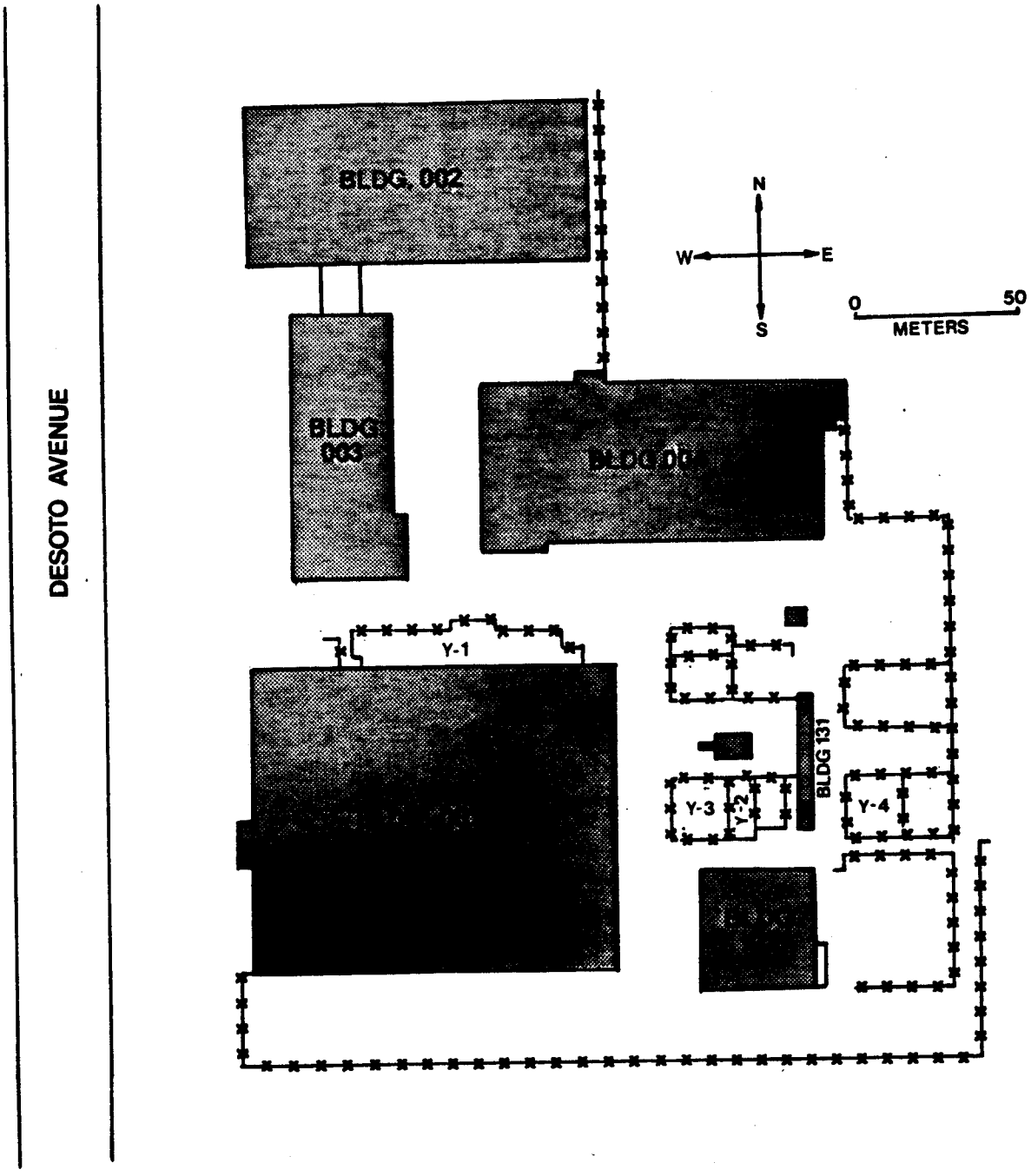

FIGURE 2: Plan View of ESG Headquarters Indicating Location of Building 004.

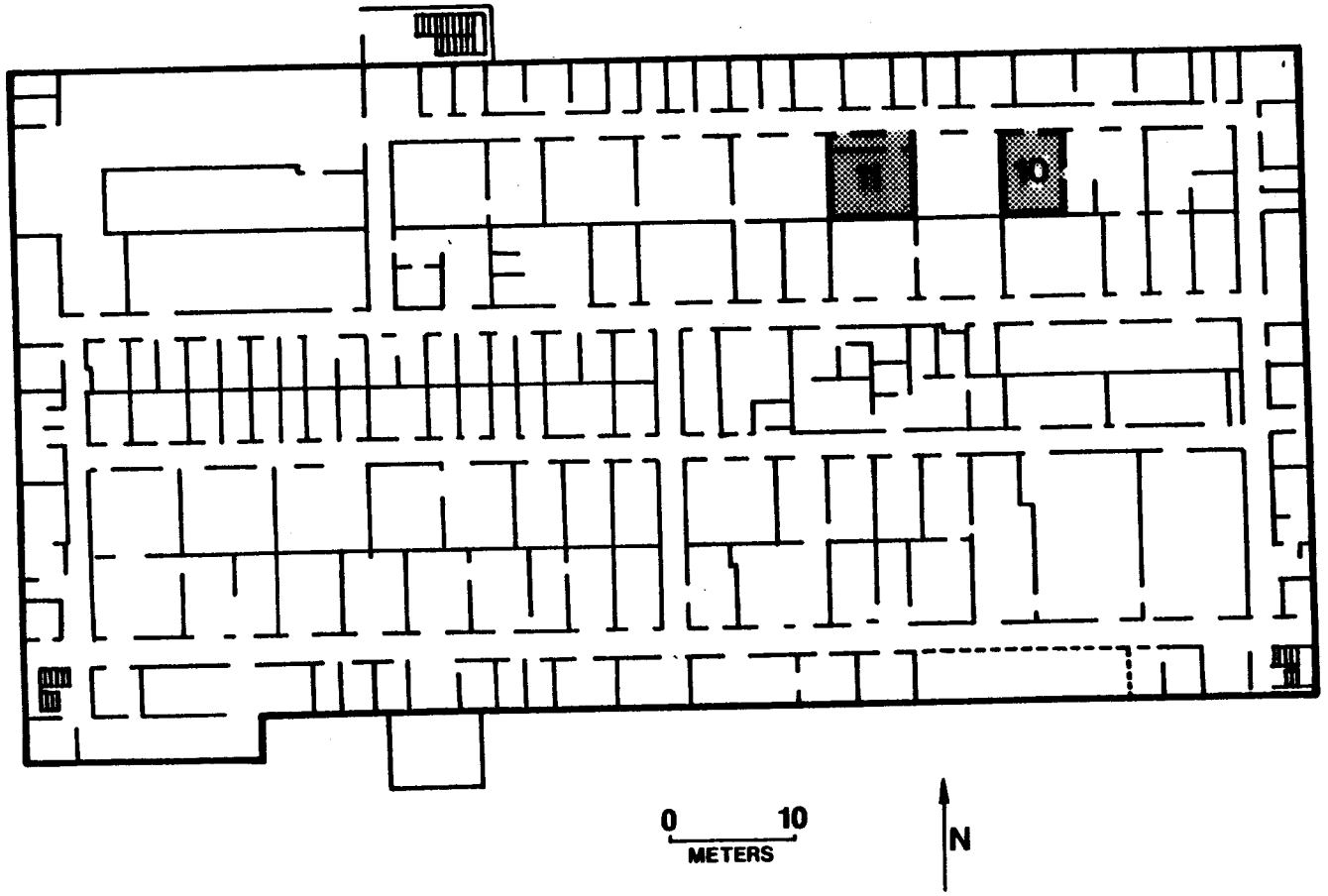

FIGURE 3: Building 004 First Floor Plan Indicating Location of the Emission Spectrometer Lab (10) and the X-ray Diffraction Lab (11).

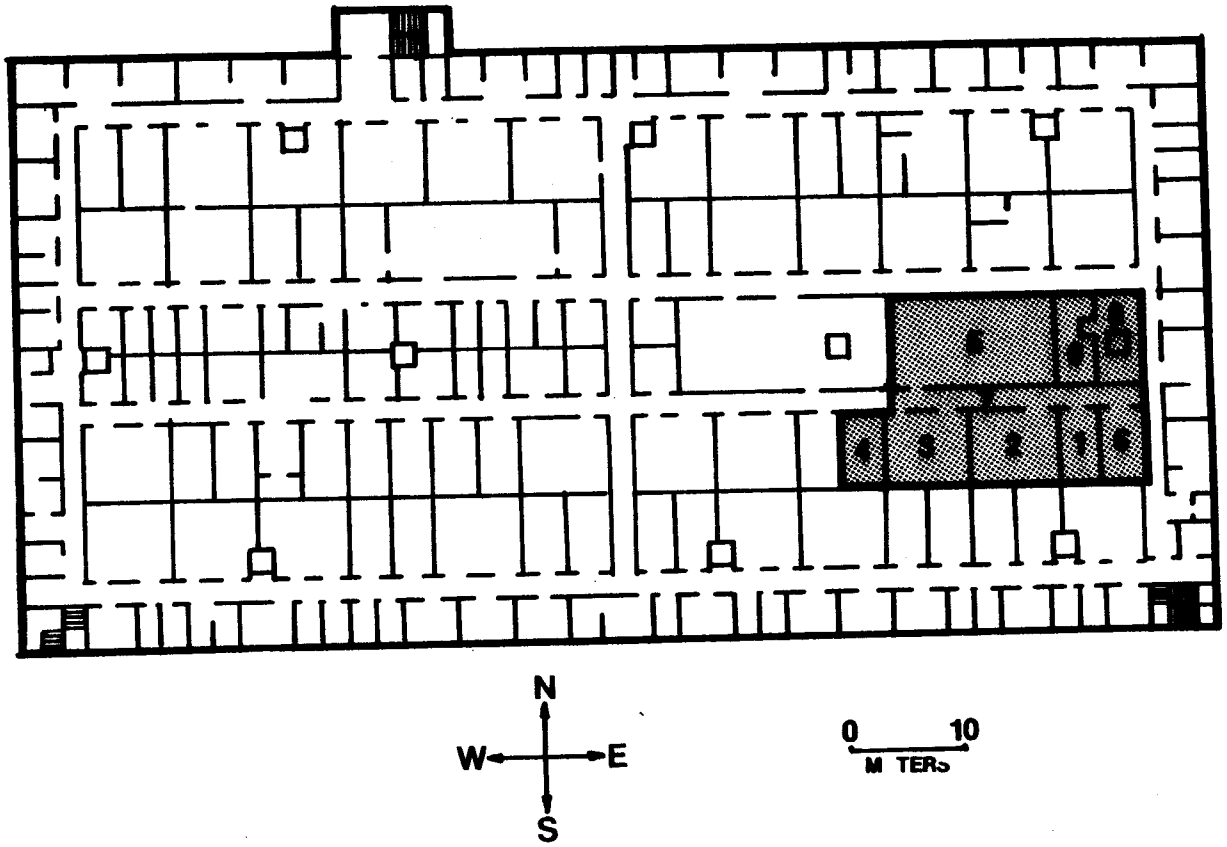

FIGURE 4: Building 004 Second Floor Plan Indicating Location of Hot Chemistry Area (1-9).

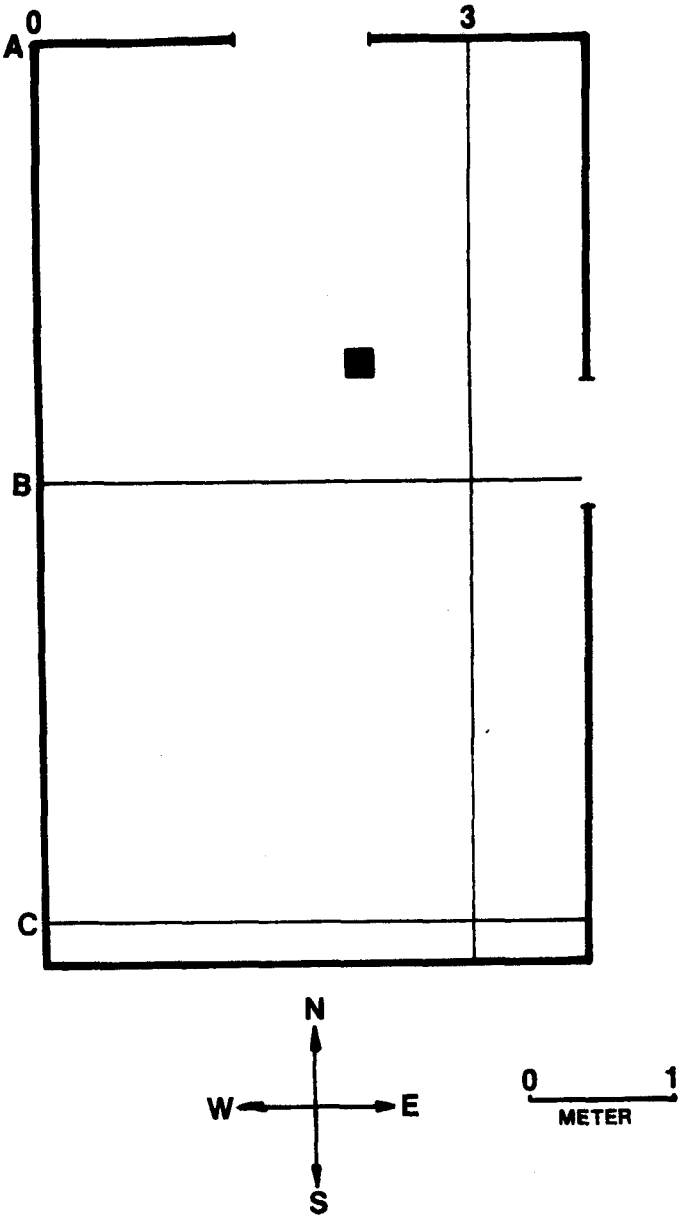

FIGURE 5: Grid System - Emission Spectrometer Lab (10).

■ Indicates Location of Elevated Contact Radiation Levels.

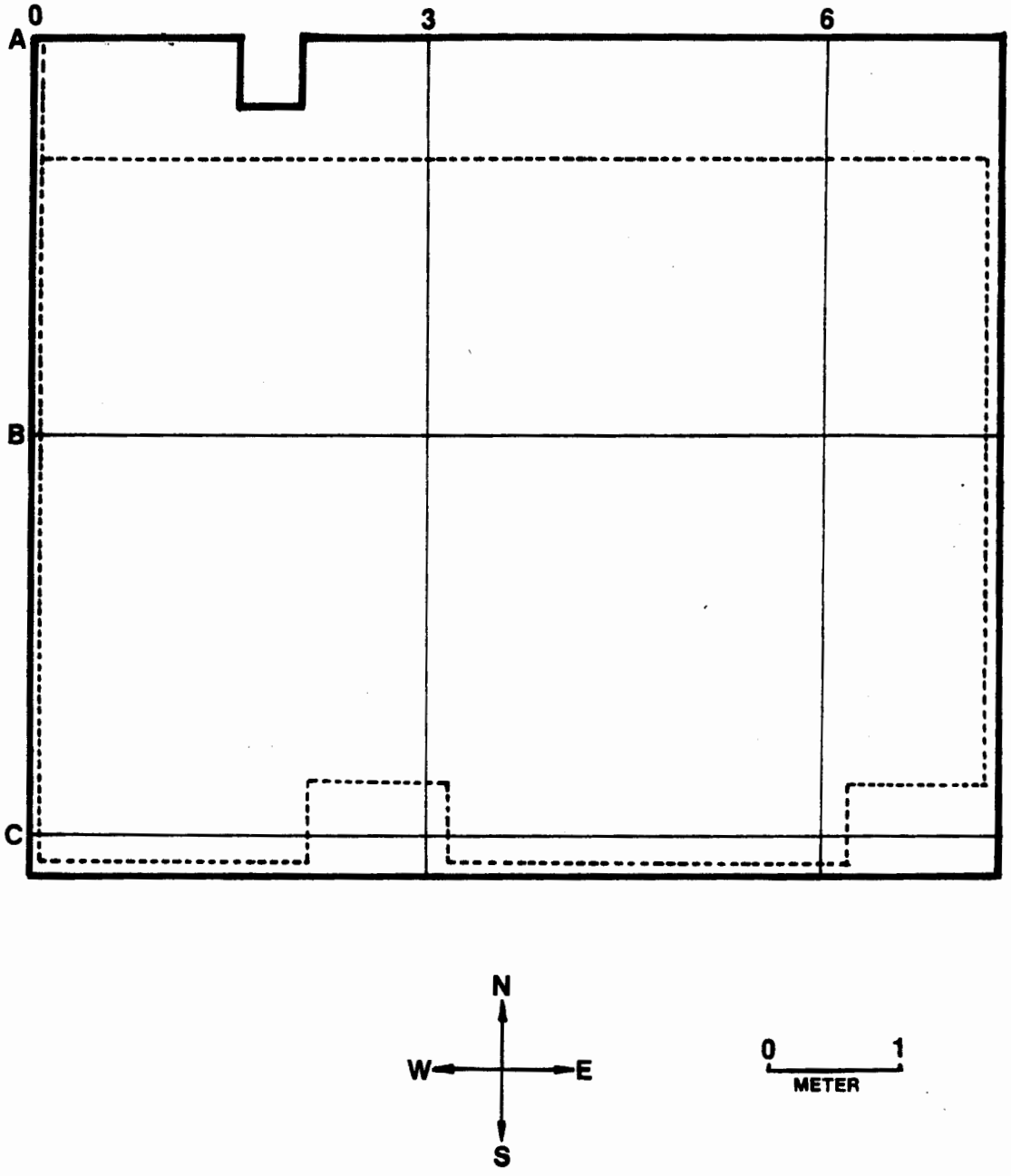

FIGURE 6: Grid System - X-ray Diffraction Lab (11).

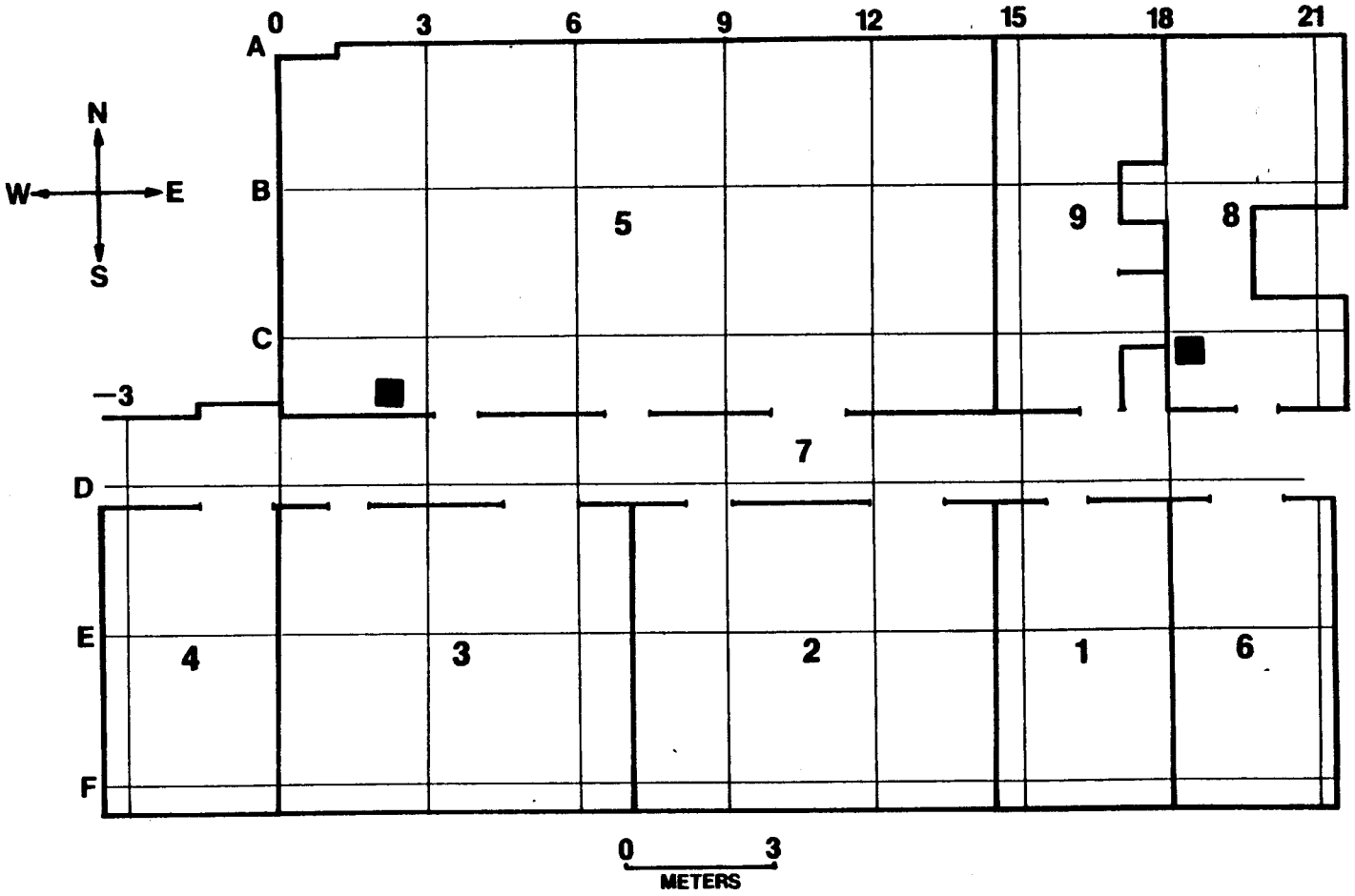

FIGURE 7: Grid System - Hot Chemistry Area (1-9).

■ Indicates Locations of Elevated Contact Radiation Levels.

TABLE 1

SUMMARY OF SURVEY RESULTS - FLOORS, WALLS, AND CEILINGS

Location[a]	Number Of Grid Blocks	TOTAL CONTAMINATION						REMOVABLE CONTAMINATION			
		Alpha (dpm/100 cm^2)		Beta-Gamma (dpm/100 cm^2)		Beta-Gamma (mrad/h)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Room 1 - Floor	15	120	38	1100	640	0.029	0.015	6	<2	8	7
Walls	15	45	20	<550	<550	0.010	0.010	10	5	6	5
Ceiling	5	27	20	880	660	0.024	0.013	4	4	6	6
Room 2 - Floor	25	280	78	2700	1200	0.054	0.023	<2	1	7	5
Walls	20	99	37	<550	<550	0.010	0.010	7	5	7	7
Ceiling	5	260	74	1200	690	0.030	0.014	3	3	9	9
Room 3 - Floor	10	150	59	1400	850	0.034	0.020	<2	<2	7	6
Walls	20	120	31	620	<550	0.020	0.010	6	3	11	7
Ceiling	5	27	22	620	<550	0.020	0.010	<2	<2	7	7
Room 4 - Floor	21	1900	260	4100	1300	0.108	0.033	13	5	9	6
Walls	15	45	21	<550	<550	0.010	0.010	6	3	5	<5
Ceiling	5	45	23	1100	660	0.027	0.015	<2	<2	7	7
Room 5 - Floor	58	1100	230	4600	1200	0.084	0.022	14	4	14	9
Walls	20	63	26	1496	640	0.034	0.012	10	6	10	9
Ceiling	10	27	20	1056	600	0.027	0.011	4	3	6	<5
Room 6 - Floor	10	99	53	1800	930	0.039	0.020	<2	<2	8	6
Walls	20	63	23	<550	<550	0.010	0.010	3	2	12	7
Ceiling	5	45	23	<550	<550	0.010	0.010	<2	<2	4	<5
Room 7 - Floor	10	81	31	1800	900	0.039	0.021	4	<2	6	<5
Walls	10	99	41	<550	<550	0.010	0.010	11	11	8	7
Ceiling	5	63	34	<550	<550	0.010	0.010	<2	<2	4	<5

TABLE 1 (Continued)

SUMMARY OF SURVEY RESULTS - FLOORS, WALLS, AND CEILINGS

Location	Number Of Grid Blocks	TOTAL CONTAMINATION						REMOVABLE CONTAMINATION			
		Alpha (dpm/100 cm^2)		Beta-Gamma (dpm/100 cm^2)		Beta-Gamma (mrad/h)		Alpha (dpm/100 cm^2)		Beta (dpm/100 cm^2)	
		Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average	Maximum	Average
Room 8 - Floor	10	99	31	1500	810	0.034	0.020	3	<2	9	7
Walls	20	27	20	700	560	0.021	0.010	3	<2	19	8
Ceiling	5	63	36	880	650	0.024	0.015	<2	<2	7	7
Room 9 - Floor	10	99	30	1300	930	0.031	0.024	<2	<2	6	<5
Walls	20	63	22	1400	600	0.033	0.011	11	3	11	7
Ceiling	5	45	23	1100	660	0.027	0.015	4	4	5	<5
Room 10 - Floor	15	150	59	1900	930	0.041	0.021	4	<2	12	7
Walls	20	99	49	4500[b]	1400[b]	0.082	0.027	10	5	14	8
Ceiling	5	45	23	1200	940	0.030	0.023	<2	<2	7	7
Room 11 - Floor	25	99	46	4000	760	0.076	0.015	3	<2	7	6
Walls	20	99	47	790	470	0.023	0.012	<2	<2	15	7
Ceiling	5	81	45	1100	650	0.027	0.013	<2	<2	7	7

[a] Refer to Figures 3 and 4.

[b] Elevated beta-gamma levels due to presence of Co-60 source in adjacent room.

TABLE 2

SUMMARY OF SURVEY RESULTS - DRAINS, PIPES, LEDGES, ETC.

Location[a]	Grid[b] Identification	Surface	TOTAL CONTAMINATION			REMOVABLE CONTAMINATION	
			Alpha (dpm/100 cm^2)	Beta-Gamma (dpm/100 cm^2)	Beta-Gamma (mrad/h)	Alpha (dpm/100 cm^2)	Beta (dpm/100 cm^2)
Room 1	E15	Pipe	27	<550	0.010	7	13
	E18	Light Fixture	27	<550	0.010	<2	11
Room 2	E9	Light Fixture	27	<550	0.010	<2	12
	E15	Air Conditioning Vent	27	<550	0.010	7	11
Room 3	E3	Pipe	27	<550	0.010	6	12
	D6	Light	<18	<550	0.010	110	99
Room 4	D0	Electrical Box	45	<550	0.010	<2	<5
	F0	Pipe	63	<550	0.010	3	7
Room 5	A3	Drain	<18	<550	0.010	<2	<5
	A12	Drain	45	<550	0.010	<2	7
	A15	Drain	63	<550	0.010	<2	<5
	B6	Light	<18	<550	0.013	6	7
	C12	Air Conditioning Vent	27	<550	0.011	<2	9
Room 6	E21	Light	<18	<550	0.010	3	6
	F21	Pipe	27	<550	0.010	3	<5
Room 7	C0	Firehose Box	260	<550	0.010	3	<5
	C15	Coat Rack	27	<550	0.010	17	14
Room 8	A21	Air Conditioning Vent	<18	<550	0.010	3	10
	B18	Drain	<18	<550	0.010	3	9
	C21	Light Fixture	<18	<550	0.010	<2	<5

TABLE 2 (Continued)

SUMMARY OF SURVEY RESULTS - DRAINS, PIPES, LEDGES, ETC.

Location	Grid Identification	Surface	TOTAL CONTAMINATION			REMOVABLE CONTAMINATION	
			Alpha (dpm/100 cm^2)	Beta-Gamma (dpm/100 cm^2)	Beta-Gamma (mrad/h)	Alpha (dpm/100 cm^2)	Beta (dpm/100 cm^2)
Room 9	A18	Coat Rack	<18	<550	0.010	9	8
	B18	Light Fixture	45	<550	0.010	3	12
	B18	Drain	27	<550	0.010	3	7
Room 10	A3	Baseboard	81	<550	0.010	10	6
		Post	230	<550	0.010	3	<5
		Equipment	860	<550	0.010	3	<5
	B3	Light Fixture	150	1100	0.027	16	9
		Pipe	45	<550	0.010	<2	<5
		Equipment	27	<550	0.010	28	9
	C3	Pipe	<18	1800	0.039	<2	10
		Pipe	120	1900	0.041	<2	7
		Drain	27	880	0.024	<2	7
Room 11	A3	Electrical Box	27	<550	0.010	<2	<5
	A6	Equipment	81	<550	0.010	3	7
		Drawer	<18	<550	0.010	<2	8
		Air Conditioning System	27	970	0.026	<2	<5

TABLE 2 (Continued)

SUMMARY OF SURVEY RESULTS - DRAINS, PIPES, LEDGES, ETC.

Location	Grid Identification	Surface	TOTAL CONTAMINATION			REMOVABLE CONTAMINATION	
			Alpha (dpm/100 cm^2)	Beta-Gamma (dpm/100 cm^2)	Beta-Gamma (mrad/h)	Alpha (dpm/100 cm^2)	Beta (dpm/100 cm^2)
Room 11	B3	Wooden Frame	99	<550	0.010	7	8
		Copper Wall	<18	<550	0.010	<2	<5
		Drawer	<18	<550	0.010	<2	<5
		Pipe Bracket	<18	<550	0.010	<2	<5
		Equipment	<18	<550	0.010	4	7
	B6	Equipment	140	620	0.020	6	7

[a] Refer to Figures 3 and 4.

[b] Grid identification refers to northwest corner of grid block - see Figures 5, 6, and 7.

TABLE 3

RESULTS OF ROOF SMEARS

Location[a]	REMOVABLE CONTAMINATION	
	Alpha (dpm/100 cm^2)	Beta (dpm/100 cm^2)
Above Room 3 - Roof	<2	7
Above Room 3 - Air Conditioning Vent	3	7
Above Room 5 - Roof	<2	<5
Above Room 5 - Air Conditioning Vent	3	7
Above Room 6 - Air Conditioning Vent	<2	6

[a] Refer to Figure 4.

TABLE 4

RESULTS OF PAINT SAMPLE ANALYSIS

Location[a]	Wall	CONTAMINATION	
		Alpha (dpm)	Beta (dpm)
Room 2	West	4	6
Room 3	South	<2	20
Room 4	West	5	8
Room 5	North	4	<5
Room 5	East	<2	<5
Room 6	East	4	<5
Room 7	North	<2	<5
Room 10	South	<2	<5
Room 10	East	<2	<5
Room 11	North	<2	6
Room 11	South	5	<5

[a] Refer to Figures 3 and 4.

TABLE 5

CONTAMINATION LEVELS MEASURED AT LOCATIONS
IDENTIFIED BY THE SURFACE SCAN

Location[a]	Grid Identification	Surface	BEFORE DECONTAMINATION		AFTER DECONTAMINATION	
			Alpha (dpm/100 cm^2)	Beta-Gamma (dpm/100 cm^2)	Alpha (dpm/100 cm^2)	Beta-Gamma (dpm/100 cm^2)
Room 5	C3	Floor	<18	3,800	<18	521
Room 8	C21	Floor	63	11,000	54	2,100
Room 10	A3	Floor	4,500	<550	45	1,400

[a] Refer to Figures 5 and 7.

REFERENCES

1. Radiation Survey for Release for Unrestricted Use of Hot Chemistry Laboratory Area, ESG Headquarters, Building 004, 130SRR000001, Rockwell International, May 30, 1984.

APPENDIX A

MAJOR ANALYTICAL EQUIPMENT

APPENDIX A

Major Analytical Equipment

The display or description of a specific product is not to be construed as an endorsement of that product or its manufacturer by the authors or their employer.

A. Direct Radiation Measurements

Eberline "RASCAL"
Portable Ratemeter-Scaler
Model PRS-1
(Eberline, Sante Fe, NM)

Eberline PRM-6
Portable Ratemeter
(Eberline, Sante Fe, NM)

Ludlum Alpha Floor Monitor
Model 239-1
(Ludlum, Sweetwater, TX)

Eberline Beta-Gamma "Pancake" Probe
Model HP-260
(Eberline, Sante Fe, NM)

Victoreen Beta-Gamma "Pancake" Probe
Model 489-110
(Victoreen, Inc., Cleveland, OH)

Eberline Alpha Scintillation Probe
Models AC-3-7 and AC-3-8
(Eberline, Sante Fe, NM)

Victoreen Gamma Scintillation (NaI) Probe
Model 489-55
(Victoreen, Inc., Cleveland, OH)

Reuter-Stokes Pressurized Ionization Chamber
Model RSS-111
(Reuter-Stokes, Cleveland, OH)

B. Laboratory Analyses

Low Background Alpha-Beta Counter
Model LB5100-2080
(Tennelec, Inc., Oak Ridge, TN)

APPENDIX B

ANALYTICAL PROCEDURES

APPENDIX B

Analytical Procedures

Alpha and Beta-gamma Measurements

Measurements of direct alpha radiation levels were performed using Eberline "Rascal" Model PRS-1 portable ratemeter/scalers with Model AC-3-7 and AC-3-8 ZnS alpha scintillation probes. Measurements of direct beta-gamma radiation levels were performed using Eberline Model PRS-1 portable ratemeter/scalers with Model HP-260 thin-window "pancake" G-M probes.

Count rates (cpm) were converted to disintegration rates (dpm/100 cm^2) as follows:

$$\text{Disintegration Rate} = \frac{\text{(gross rate - background rate)}}{\text{efficiency}} \times \frac{100}{\text{detector area } (cm^2)}$$

For the "pancake" G-M probes, the average background count rate was 40 cpm; background count rates for the ZnS alpha probes averaged approximately 1 cpm. Effective window areas were 15 cm^2 for the G-M probes and 59 cm^2 for the ZnS probes. Using this technique, the count rates recorded by the detector are converted to contamination levels as if the distribution were constant over a 100 cm^2 area. This conservatively overestimates disintegration rates for small areas.

Beta-gamma surface scans were performed using Eberline PRM-6 portable ratemeters with Victoreen Model 489-110 "pancake" GM detectors. Alpha surface scans were performed using a Ludlum alpha proportional floor monitor, Model 239-1 with an Eberline PRS-1 ratemeter/scaler.

Beta-Gamma Dose Rate Measurements

Beta and gamma dose rates were calculated individually and the results summed for a combined beta-gamma dose rate. Beta dose rates were calculated by applying the conversion factor of 1,400 cpm/mrad/h to the net beta count rate. The gamma dose rate component was assumed to be a constant 0.010 mrad/h, based on an average exposure rate of 10 μR/h measured in the facility.

Removable Contamination Levels

Removable contamination levels were determined by smearing a 100 cm^2 area using 5 cm diameter filter paper. The smears were counted for gross alpha and gross beta activity using a Tennelec Model LB-5100 low-background proportional counter, and appropriate background and efficiency corrections were applied. The less than symbol utilized with data in Tables 1-3 indicates that the levels measured were less than the minimum statistical detection limit of the procedure. These minimum detectable levels are reflected in the summary tables, but not on the contamination sheets included in Appendix B.

Paint Sample Measurements

Samples of paint were collected by scraping an area of approximately 100 cm^2. Residues were dried, pulverized, and counted for alpha and beta contamination using the same method and equipment used for evaluating smears.

Gamma Exposure Rate

Measurements of gamma exposure rates were performed using an Eberline PRM-6 portable ratemeter with a Victoreen Model 489-55 gamma scintillation probe containing a 3.2 cm x 3.8 cm NaI(Tl) scintillation crystal. Count rates were converted to exposure rates (μR/h) using factors determined by comparing the response of the scintillation detector with that of a Reuter Stokes model RSS-111 pressurized ionization chamber.

APPENDIX C

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U.S. Nuclear Regulatory Commission
Divison of Fuel Cycle & Material Safety
Washington, D.C. 20555

July 1982

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces or premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table 1. A copy of

the survey report shall be filed with the Division of Fuel Cycle and Material Safety, USNRC, Washington, D.C. 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report should be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

a. Identify the premises.

b. Show that reasonable effort has been made to eliminate residual contamination.

c. Describe the scope of the survey and general procedures followed.

d. State the findings of the survey in units specified in the instruction.

Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

Nuclides[a]	Average[b,c,f]	Maximum[b,d,f]	Removable[b,e,f]
U-nat, U-235, U-238, and associated decay products	5,000 dpm α/100 cm^2	15,000 dpm α/100 cm^2	1,000 dpm α/100 cm^2
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm^2	300 dpm/100 cm^2	20 dpm/100 cm^2
Th-nat, Th-232, Sr-90, Ra-223 Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm^2	3000 dpm/100 cm^2	200 dpm/100 cm^2
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm $\beta\gamma$/100 cm^2	15,000 dpm $\beta\gamma$/100 cm^2	1000 dpm $\beta\gamma$/100 cm^2

[a] Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

[b] As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

[c] Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

[d] The maximum contamination level applies to an area of not more than 100 cm^2.

[e] The amount of removable radioactive material per 100 cm^2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

[f] The average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h at 1 cm and 1.0 mrad/h at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

APPENDIX D

CONTAMINATION SURVEY SUMMARY SHEETS

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 1 424-76

ESG	GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) c/m	ALPHA(a) d/m/100cm²	BETA (b) c/m	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
1,6	F E-18	FLOOR - ESG BLOCK 1,6 (REPEAT)												
		a	14	117	42	<550	0.010			0	0	4.5	8.3	F 2C
α	3/4	b	4	27	54	616	0.020							
β	5/4	c	0	<18	46	<550	0.010							
		d	2	<18	66	1144	0.029							
		e	4	27	58	792	0.023							
3,3	F D18	FLOOR ESG BLOCK 3,3 (REPEAT)												
		a	4	27	58	792	0.023							
α	3/4	b	10	81	38	<550	0.010							
β	5/4	c	6	45	58	792	0.023							
		d	0	<18	42	<550	0.010							F 2E
		e	12	99	44	<550	0.010			0.5	1.4	2.5	4.6	
N	E15-E18	BLOCK 9 NORTH WALL - FLOOR												
		a	2	<18	22	<550	0.010							
α	8/2	b	4	27	32	<550	0.010							
β	1/9	c	2	<18	32	<550	0.010							
		d	2	<18	46	<550	0.010			2.0	5.7	4.5	8.3	N4
		e	0	<18	30	<550	0.010							

INSTRUMENTS USED (a) PRS-1+2nS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS

AVERAGE GAMMA MEASUREMENTS AT 1 m (10 uR/h)

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 1 424-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) c/m	ALPHA(a) d/m/100cm²	BETA (b) c/m	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
F18-F15	SOUTH WALL BLOCK 4												
	a	0	<18	30	<550	0.010							
α 8/2	b	2	<18	34	<550	0.010							S
β 1/9	c	6	45	38	<550	0.010			3.5	10.0	3.0	5.6	2
	d	0	<18	24	<550	0.010							
	e	0	<18	32	<550	0.010							
E18-F18	EAST WALL BLOCK 1												
	a	1	<18	32	<550	0.010							
α 8/2	b	2	<18	38	<550	0.010			2.0	5.7	2.5	4.6	
β 1/9	c	0	<18	48	<550	0.010							E 3
	d	0	<18	40	<550	0.010							
	e	0	<18	44	<550	0.010							
E15-D15	WEST WALL ESG BLOCK 6,2												
	a	0	<18	34	<550	0.010							
α 8/2	b	0	<18	40	<550	0.010			0	0	3.0	5.6	W1
β 1/9	c	2	<18	36	<550	0.010							
	d	2	<18	28	<550	0.010							
	e	2	<18	34	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + GM (c) Prm-6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M - (10 uR/h)

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 1 424-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA (a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/ 5 m	d/m/100cm²	c/ 5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
2,1	O 18	CEILING ESG BLOCK 2,1										
	a	2	<18	34	<550	0.010						
~~A~~ 8/2	b	0	<18	60	880	0.024						
B 1/9	c	0	<18	40	<550	0.010						
	d	0	<18	28	<550	0.010						
	e	4	72	44	<550	0.010			1.5	4.3	3.0	5.6

C/5

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM-6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M - (10 µR/h)

SURVEYOR(s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

Hot spots

FACILITY ESG BLDG 004 ROOM #1 424-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA (a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
		NONE										

INSTRUMENTS USED (a)____ (b)____ (c)____ (d)____ (e)____

BACKGROUND (a)____ (b)____ (c)____ (d)____ (e)____

REMARKS AVERAGE

SURVEYOR(s) LLS / TJS / KEP / BZ / BW DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

Misc. Smears.

FACILITY ESG BLDG. 004 ROOM # 1 424-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/m (SPA)	d/m/100cm²	c/m (SPA)	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
		-										
E, 15	PIPE	4	27	42	<550	0.010			2.5	7.1	7.0	12.9
E, 18	[illegible]	4	27	46	<550	0.010			0.5	1.4	6.0	11.1
α 8/2												
B 1/9												

INSTRUMENTS USED (a) PRS-1 + 7AS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm^2	c/ m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2	
D 12	FLOOR	ESG	BLOCK	15,2	(REPEAT)								
	a	28	243	70	1320	0.031							F
α 3/14	b	32	279	84	1936	0.041			0.5	1.4	2.5	4.6	19
β 5/4	c	24	207	56	704	0.021							
	d	14	117	54	616	0.020							
	e	32	279	68	1232	0.030							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT - 1M = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm^2	c/ m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2	
E 12	FLOOR	BLOCK 3											
	a	0	<18	70	1320	0.031							
α 3/14	b	8	63	52	528	0.019							
β 5/4	c	14	117	62	968	0.026							
	d	8	63	40	<550	0.010							
	e	10	81	76	1584	0.036			0.5	1.4	3.5	6.5	F 35
D 15	FLOOR	BLOCK	ESG 7,2	(REPEAT)									
	a	4	27	72	1408	0.033							
α 3/14	b	6	45	102	2728	0.054			0	0	3.5	6.5	F 35
β 5/4	c	2	<18	82	1848	0.040							
	d	14	117	68	1232	0.030							
	e	2	<18	60	880	0.024							
D 9	FLOOR	BLOCK 6											
	a	6	45	52	528	0.019							
α 3/14	b	2	<18	44	176	0.013							F
β 5/4	c	2	<18	70	1320	0.031			0	0	3.5	6.5	3
	d	4	27	56	704	0.020							
	e	8	63	68	1232	0.030							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 cpm (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA (a) c/m	ALPHA (a) d/m/100cm^2	BETA (b) c/m	BETA (b) d/m/100cm^2	mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm^2	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm^2	
E-9	FLOOR - ESG BLOCK 1,5 (REPEAT)												
	a	2	<18	78	1672	0.037			0	0	1.5	2.8	F 29
α 3/14	b	2	<18	56	704	0.021							
β 5/4	c	0	<18	68	1232	0.030							
	d	2	<18	64	1056	0.027							
	e	2	<18	72	1408	0.033							
F-9 → E-9	WEST WALL ESG BLOCK 2,2 (REPEAT)												
	a	6	45	32	<550	0.010							
α 8/2	b	2	<18	38	<550	0.010							
β 1/9	c	12	99	48	<550	0.010			1.0	2.9	3.5	6.5	W 22
	d	4	27	34	<550	0.010							
	e	4	27	34	<550	0.010							
F-12 → F-9	SOUTH WALL BLOCK ESG 21,3 (REPEAT)												
	a	0	<18	40	<550	0.010			0.5	1.4	3.5	6.5	S 23
α 8/2	b	2	<18	30	<550	0.010							
β 1/9	c	0	<18	26	<550	0.010							
	d	0	-18	38	<550	0.010							
	e	0	<18	24	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 cpm (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 μR/h

SURVEYOR (s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA (a) c/m	ALPHA (a) d/m/100cm^2	BETA (b) c/m	BETA (b) d/m/100cm^2	mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm^2	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm^2	
E-12 →	F-12 EAST WALL BLOCK 4												
	a	4	27	36	<550	0.010							
α 8/2	b	4	27	32	<550	0.010							
β 1/9	c	2	<18	22	<550	0.010							
	d	0	<18	36	<550	0.010							
	e	6	45	48	<550	0.010			2.5	7.1	3.5	6.5	E 24
E-9 →	E-12 NORTH WALL ESG BLOCK 3,3 (REPEAT)												
	a	0	<18	30	<550	0.010							
α 8/2	b	0	<18	30	<550	0.010							
β 1/9	c	2	<18	40	<550	0.010			2.5	7.1	3.5	6.5	N 25
	d	0	<18	40	<550	0.010							
	e	0	<18	46	<550	0.010							
E-12	CEILING ESG BLOCK 2,3 (REPEAT)												
	a	2	<18	24	<550	0.010							
α 8/2	b	0	<18	28	<550	0.010							
β 1/9	c	30	261	68	1232	0.030			1.0	2.9	5.0	9.3	C 26
	d	4	27	32	<550	0.010							
	e	6	45	50	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 μR/h

SURVEYOR (s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

Hot Spots

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM #2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA (a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm^2	c/.5m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
		-										
		NONE										

INSTRUMENTS USED (a)____ (b)____ (c)____ (d)____ (e)____

BACKGROUND (a)____ (b)____ (c)____ (d)____ (e)____

REMARKS____

SURVEYOR (s) TJS DATE 6-20-84

Misc. Smears.

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM #2 424-74

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA (a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~cpm~~ c/.0 m	d/m/100cm^2	~~cpm~~ c/.5m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
9 B/2												
B 1/9												
E, 9	Light Fix.	4	27	46	4550	0.010			0.5	1.4	6.5	12.0
E, 15	A.C Vent.	4	27	50	4550	0.010			2.5	7.1	6.0	11.1

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR (s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY: ESG BLDG. 004 ROOM 3 424-68

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm²	c/ m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
E6	FLOOR - ESG BLOCK			4,3	(REPEAT)								
	a	10	81	60	880	0.024							
α 3|4	b	14	117	56	704	0.021							
β 5|4	c	6	45	64	1056	0.027							
	d	18	153	62	968	0.026			0	0	4.0	7.4	F 17
	e	2	<18	72	1408	0.034							
E6	FLOOR BLOCK 6												
	a	2	<18	52	<550	0.010							
α 3|4	b	8	63	48	<550	0.010			0.5	1.4	2.0	3.7	F 18
β 5|4	c	2	<18	60	880	0.024							
	d	6	45	62	968	0.026							
	e	4	27	50	<550	0.010							
E-6 → E-9	NORTH WALL ESG BLOCK 7, 1 (REPEAT)												
	a	4	27	34	<550	0.010			0	0	3.0	5.6	N 30
α 8|2	b	2	<18	38	<550	0.010							
β 1|9	c	0	<18	48	<550	0.010							
	d	0	<18	38	<550	0.010							
	e	2	<18	30	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM 6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 cpm (d) 0.15 c/m (e) 1.2 c/m

REMARKS E. FLOOR GAMMA MEASUREMENT AT 1m = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 3 424-68

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm²	c/ m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
F-9 → F-6	SOUTH WALL ESG BLOCK 1, 3 (REPEAT)												
	a	6	45	44	<550	0.010							
α 8|2	b	0	<18	50	<550	0.010							
β 1|9	c	14	117	54	616	0.020			2.0	5.7	1.5	2.8	S 23
	d	0	<18	48	<550	0.010							
	e	6	45	50	<550	0.010							
D-6 → E-6	EAST WALL, BLOCK 6												
	a	6	45	30	<550	0.010			2.0	5.7	6.0	11.1	E 29
α 8|2	b	0	<18	28	<550	0.010							
β 1|9	c	0	<18	32	<550	0.010							
	d	0	<18	36	<550	0.010							
	e	4	27	40	<550	0.010							
F-0 → E-0	WEST WALL ESG BLOCK 1, 2 (REPEAT)												
	a	14	81	28	<550	0.010			0	0	5.0	9.3	W 27
α 8|2	b	4	27	38	<550	0.010							
β 1|9	c	0	<18	26	<550	0.010							
	d	0	<18	26	<550	0.010							
	e	2	<18	28	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM 6 + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 3 424-68

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/ 0 m	d/m/100cm^2	c/ 0m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
E 3	CEILING	ESG BLOCK 2, 3 (REPEAT)										
	a	0	<18	34	<550	0.010						
8|2	b	0	<18	50	<550	0.010						
B|9	c	0	<18	46	<550	0.010						
	d	4	27	54	(116	0.020			0.5	1.4	4.0	7.4
	e	4	27	36	<550	0.010						

C
31

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) Pancake + NaI (d) LB 5100 (e) LB 5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 cpm (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h.

SURVEYOR(s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

Hot Spots

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM #3 424-68

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm^2	c/.5m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
		NONE										

INSTRUMENTS USED (a) (b) (c) (d) (e)

BACKGROUND (a) (b) (c) (d) (e)

REMARKS

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

Misc. Smears

FACILITY ESG BLDG 004 ROOM #3 424-6B

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~CPM~~	d/m/100cm^2	~~CPM~~	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
		-										
∝ B/2												
B 1/9												
E, 3	Pipe	4	27	44	<550	0.010			2.0	5.7	6.5	12.0
D, 6	Light	2	<18	50	<550	0.010			37.5	110.3	53.5	99.1

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM6 + NaI (d) LBS100 (e) LB5100

BACKGROUND (a) 1c/m (b) 40c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE Gamma MEASUREMENT = 10 µR/h

SURVEYOR(s) JJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 4 424-62

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) c/δ m	ALPHA(a) d/m/100cm²	BETA (b) c/δm	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
E-0	FLOOR - BLOCK 9												
	a	2	418	66	1144	0.029							
α 3|4	b	22	189	60	880	0.024			1.5	4.3	5.0	9.3	F 13
β 5|4	c	12	99	70	1320	0.031							
	d	6	45	60	880	0.024							
	e	20	171	54	616	0.020							
D-0	FLOOR BLOCK 4												
	a	206	1845	134	4136	0.077			1.5	4.3	4.0	7.4	F 2
α 3|4	b	30	361	72	1408	0.033							
β 5|4	c	14	117	52	<550	0.010							
	d	16	135	92	2288	0.047							
	e	10	81	62	968	0.026							
D-3	FLOOR ESG BLOCK 3, 1 (REPEAT)												
	a	8	63	68	1232	0.030			1.0	2.9	2.0	3.7	F 15
α 3|4	b	0	418	70	1320	0.031							
β 5|4	c	8	63	60	880	0.024							
	d	0	418	70	1320	0.031							
	e	4	27	68	1232	0.030							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 4 424-62

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) c/δ m	ALPHA(a) d/m/100cm²	BETA (b) c/δm	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
D-3	FLOOR		BLOCK 7										
	a	4	27	64	1056	0.027							
α 3|4	b	4	27	60	880	0.024							
β 5|4	c	8	63	86	2024	0.043							
	d	14	117	72	1408	0.033							
	e	18	153	52	<550	0.010			0.5	1.4	2.0	3.7	F 16
F-0 → F-3	SOUTH WALL ESG BLOCK 3, 3 (REPEAT)												
	a	2	418	50	<550	0.010			1.0	2.9	1.5	2.8	S 33
α 8|2	b	2	418	42	<550	0.010							
β 1|9	c	2	418	20	<550	0.010							
	d	2	418	22	<550	0.010							
	e	2	418	28	<550	0.010							
E-0 → F-0	EAST WALL BLOCK 3 (REPEAT)												
	a	0	418	40	<550	0.010							
α 8|2	b	6	45	34	<550	0.010			0.5	1.4	2.0	3.7	E 34
β 1|9	c	0	418	14	<550	0.010							
	d	0	418	30	<550	0.010							
	e	4	27	34	<550	0.010							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLOG. 004 ROOM 4 424-62

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/ m	d/m/100cm^2	c/ m	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
F-3 →	E-3	WEST	WALL	ESG	BLOCK	3,3	(REPEAT)					
	c	0	<18	38	<550	0.010						
α 8/2	b	0	<18	46	<550	0.010						
D 1/9	c	0	<18	44	<550	0.010						
	d	4	27	30	<550	0.010						
	e	2	<18	52	<550	0.010			2.0	5.7	2.5	4.6
D 0	CEILING	BLOCK	ESG	2,2 (REPEAT)								
	a	6	45	64	1056	0.027			0.5	1.4	4.0	7.4
α 8/2	b	0	<18	50	<550	0.010						
B 1/9	c	2	<18	38	<550	0.010						
	d	0	<18	54	616	0.020						
	e	2	<18	34	<550	0.010						

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR(S) LLS / TJS / KSP / BZ / BW DATE 6-19-84

Misc. Smears

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLOG 004 ROOM # 4 424-62

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		CPM	d/m/100cm^2	CPM	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
α 8/2 B 1/9												
D, 0	Elec. Box	6	45	40	<550	0.010			0	0	0.5	0.9
F, 0	H$_2$O Pipe	8	.63	40	<550	0.010			1	2.9	3.5	6.5

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR(S) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/min	d/m/100cm²	c/min	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
A 3	FLOOR - BLOCK 5												
	a	10	41	60	880	0.024							
α 3/4	b	18	153	54	616	0.020			1.5	4.3	6.5	12.0	F1
B 5/4	c	8	<63	44	<550	0.010							
	d	12	99	68	1232	0.030							
	e	8	<63	74	1496	0.034							
A 6	FLOOR BLOCK ESG 6,1 (REPEAT)												
	a	22	189	64	1056	0.027							
α 3/4	b	36	315	56	704	0.021							F2
B 5/4	c	66	585	54	616	0.020			0	0	4.0	7.4	
	d	26	225	52	<550	0.010							
	e	44	387	44	<550	0.010							
A 6	FLOOR BLOCK 6												
	a	30	261	90	2200	0.046							F3
α 3/4	b	90	801	48	<550	0.010			2.5	7.1	3.0	5.6	
B 5/4	c	14	117	60	880	0.024							
	d	14	117	68	1232	0.030							
	e	34	297	68	1232	0.030							

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 MR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/min	d/m/100cm²	c/min	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
B-3	FLOOR BLOCK 7												
	a	2	<18	48	<550	0.010							
α 3/4	b	4	27	66	1144	0.028							
B 5/4	c	12	99	44	<550	0.010			1.5	4.3	9.5	17.6	F4
	d	4	27	86	2024	0.042							
	e	12	99	60	880	0.024							
B-6	FLOOR BLOCK 6												
	a	22	189	66	1144	0.028							
α 3/4	b	14	117	68	1232	0.030							
B 5/4	c	92	819	144	4576	0.084			0.5	1.4	5.0	9.3	F5
	d	40	351	72	1408	0.033							
	e	28	243	70	1320	0.031							
B-9	FLOOR BLOCK 4												
	a	30	261	50	440	0.017							
α 3/4	b	118	1053	66	1144	0.028							
B 5/4	c	20	171	74	1496	0.034							
	d	110	981	66	1144	0.028			1.5	4.3	4.0	7.4	F6
	e	30	261	88	2112	0.044							

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 µR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm^2	c/ m	d/m/100cm^2	mrad/hr	c/m	uR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2	
A-9	FLOOR- ESG BLOCK 9,3 (RESEAT)												
	a	8	63	46	<550	0.010							
∝ 3/14	b	18	153	66	1144	0.029							
B 5/4	c	16	135	62	968	0.026							
	d	22	189	68	1232	0.030			1.0	2.9	3.5	6.5	F7
	e	14	117	52	<550	0.010							
C-9	FLOOR BLOCK 3												
	a	18	153	70	1320	0.031							
∝ 3/14	b	20	171	52	<550	0.010							
B 5/4	c	14	117	68	1232	0.030							
	d	28	243	64	1056	0.027			0.5	1.4	5.5	10.2	F8
	e	20	171	64	1056	0.027							
C-12	FLOOR BLOCK 3												
	a	26	225	58	792	0.023			1.5	4.3	3.5	6.5	F9
	b	16	135	56	704	0.021							
∝ 3/14	c	6	45	58	792	0.023							
B 5/4	d	20	171	54	616	0.020							
	e	20	171	64	1056	0.027							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PeS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 c/m (c) 3,000 c/m (d) 0.15 c/m (e) 1.2 c/m

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 uR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm^2	c/ m	d/m/100cm^2	mrad/hr	c/m	uR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2	
B-12	FLOOR ESG BLOCK 12,3 (RESEAT)												
	a	14	117	62	968	0.026							
∝ 3/14	b	6	45	54	616	0.020							
B 5/4	c	18	153	56	704	0.021							
	d	8	63	54	616	0.020			0	0	2.5	4.6	F10
	e	18	153	58	792	0.023							
A-14	FLOOR ESG BLOCK 14,2 (RESEAT)												
	a	12	99	76	1584	0.036							
∝ 3/14	b	6	45	68	1232	0.030							
B 5/4	c	12	99	76	1584	0.036			0.5	1.4	2.5	4.6	F11
	d	8	63	52	<550	0.010							
	e	8	63	62	968	0.026							
A-9→A-12	NORTH WALL ESG BLOCK 11,2 (RESEAT)												
	a	2	<18	44	<550	0.010							
∝ 8/2	b	2	<18	38	<550	0.010							
B 1/9	c	6	45	30	<550	0.010			0.5	1.4	5.0	9.3	N40
	d	4	27	28	<550	0.010							
	e	2	<18	44	<550	0.010							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PeS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 c/m (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 uR/h

SURVEYOR(s) LLS/TJS/KEP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/0 m	d/m/100cm²	c/0m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
C-6→	C-3	SOUTH	WALL	ESG	BLOCK	9,3	(RESPSAT)						
	a	4	27	36	<550	0.010							
α 8/2	b	4	27	72	1408	0.033							
B 1/9	c	2	<18	50	<550	0.010							
	d	8	63	48	<550	0.010			0.5	1.4	5.5	10.2	S 41
	e	0	<18	74	1496	0.034							
B-12→	C-12	EAST	WALL	AT	CEILING	ABOVE	BLOCK		3				
	a	2	<18	38	<550	0.010							
α 8/2	b	6	45	30	<550	0.010			3.5	10.0	4.0	7.4	E 39
B 1/9	c	0	<18	28	<550	0.010							
	d	2	<18	42	<550	0.010							
	e	2	<18	22	<550	0.010							
B-0→	A-0	WEST	WALL	BLOCK	7								
	a	2	<18	46	<550	0.010							
α 8/2	b	6	45	28	<550	0.010			3.5	10.0	5.0	9.3	W 42
B 1/9	c	0	<18	30	<550	0.010							
	d	0	<18	34	<550	0.010							
	e	4	27	26	<550	0.010							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10uR/h

SURVEYOR(s) LLS/TJS/KSP/BW/BZ DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/0 m	d/m/100cm²	c/0m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
B-3	CEILING		ESG BLOCK		2,5 (RESPSAT)								
	a	2	<18	34	<550	0.010							
α 8/2	b	0	<18	26	<550	0.010							
B 1/9	c	2	<18	40	<550	0.010			0.5	1.4	2.0	3.7	C 43
	d	0	<18	64	1056	0.027							
	e	2	<18	46	<550	0.010							
A-9	CEILING	ESG BLOCK		8,1	(RESPSAT)								
	a	0	<18	42	<550	0.010							
α 8/2	b	4	27	20	<550	0.010							
B 1/9	c	4	27	40	<550	0.010			1.5	4.3	3.0	5.6	C 41
	d	2	<18	46	<550	0.010							
	e	0	<18	28	<550	0.010							

INSTRUMENTS USED (a) PRS-1+ZnS (b) PRS-1+GM (c) PRM6+NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10uR/h

SURVEYOR(s) LLS/TJS/KSP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY — Hot Spots

FACILITY ESG BLDG 004 ROOM #5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) CPM	ALPHA(a) d/m/100cm²	BETA (b) CPM	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
									Smears			
< 8/2									Before:			
B1/9									open 0	0	2.5	4.6
									0.5	1.4	2.5	4.6
				OPEN/CLOSED							OPEN / CLOSED	mRAD
C,3	F	2	418	307/11	3760	0.20 CLEAN UP			2	418	77/56 open 521	0.04
				(AREA = 3 PROBE FACES)								
A,6	F	121	1080	66 -	1144	0.03			1.5	4.3	6.0	11.1
B,9	F	66	585	114	3256	0.06			5	14.3	7.5	13.9

INSTRUMENTS USED (a) PRS-1 + 2πS (b) PRS-1 + GM (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY — MISC SMEARS

FACILITY ESG BLDG 004 ROOM #5 424-69

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) CPM	ALPHA(a) d/m/100cm²	BETA (b) CPM	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
< 8/2												
B 1/9												
B, 6	Light	2	418	44	176	0.013			2.0	5.7	4.0	7.4
C, 12	Return	4	27	42	88	0.011			0.5	1.4	5.0	9.3

INSTRUMENTS USED (a) PRS-1 + 2πS (b) PRS-1 + GM (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 uR/h

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY Drains

FACILITY ESG 004 ROOM 5

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		CPM	d/m/100cm^2	CPM	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
A 7/10												
B 10/2												
A,B	Drain	8	63	50	<550	0.010			0	0	2.0	3.7
									2m from A12			
A,12	Drain	6	45	44	4550	0.010			0	0	4.0	7.4
									1m from A,9			
A,3	Drain	0	<18	<38	<550	0.010			0.5	1.4	2.0	3.7
									2m from A,0			

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 4.2 cpm

REMARKS AVERAGE GAMMA EXPOSURE - 1 M = 10 mR/h

SURVEYOR(s) TJS DATE 6-20

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 6 424-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/0 m	d/m/100cm²	c/0m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
D-21	FLOOR ESG BLOCK 2,2 (REPEAT)												
	a	8	63	68	1232	0.030			0	0	4.5	8.3	F 22
α 3/4	b	6	45	80	1760	0.039							
β 5/4	c	8	63	56	704	0.020							
	d	2	<18	46	<550	0.010							
	e	4	27	50	<550	0.010							
E-21	FLOOR BLOCK 9												
	a	0	<18	24	<550	0.010							
α 3/4	b	10	81	76	1584	0.036							
β 5/4	c	2	<18	54	616	0.010							
	d	12	99	40	<550	0.010							
	e	12	99	108	1232	0.030			0.5	1.4	2.5	4.6	F 21
D-18 → D-21	NORTH WALL AT CEILING ABOVE BLOCK 1								ESG BLOCK 1,1				
	a	2	<18	34	<550	0.010							
α 3/4	b	0	<18	44	<550	0.010							
β 5/4	c	2	<18	40	<550	0.010							
	d	0	<18	24	<550	0.010							
	e	4	27	34	<550	0.010			0.5	1.4	3.0	5.6	N 10

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 c/m

REMARKS

AVERAGE GAMMA MEASUREMENTS AT 1 M (10 uR/h)

SURVEYOR (s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 6 424-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
F-21 → F18	SOUTH WALL BLOCK 4												
	a	6	45	42	<550	0.010			0.5	1.4	6.5	12.0	E 8
α 8,2	b	0	<18	26	<550	0.010							
β 1,9	c	2	<18	26	<550	0.010							
	d	8	63	42	<550	0.010							
	e	2	<18	34	<550	0.010							
E-21 → F-21	EAST WALL ESG BLOCK 5,3 (REPEAT)												
	a	4	27	36	<550	0.010			1.0	2.9	3.5	6.5	E 9
α 8/2	b	0	<18	32	<550	0.010							
β 1/9	c	0	<18	28	<550	0.010							
	d	2	<18	34	<550	0.010							
	e	2	<18	32	<550	0.010							
E-18 → D-18	WEST WALL BLOCK 4												
	a	4	27	30	<550	0.010			1.0	2.9	2.0	3.7	W 7
α 8/2	b	2	<18	48	<550	0.010							
β 1/9	c	0	<18	34	<550	0.010							
	d	4	27	26	<550	0.010							
	e	2	<18	32	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS

AVERAGE GAMMA MEASUREMENT AT 1m = (10 uR/h)

SURVEYOR (s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 6 424-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
F-18 → F-21		CEILING		BLOCK 5								
	a	0	<18	48	<550	0.010						
d 8/2	b	6	45	50	<550	0.010						
B 1/9	c	2	<18	50	<550	0.010			0	0	2.0	3.7
	d	2	<18	48	<550	0.010						
	e	0	<18	42	<550	0.010						

INSTRUMENTS USED (a) PRS-1 + 2AS (b) PRS-1 + 6m (c) PRM-6-2NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1cpm (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M - 10 mR/h

SURVEYOR (s) LLS / TTS / KEP / BZ / BW DATE 6-19-84

Hot Spots

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM #6 424-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
		NONE										

INSTRUMENTS USED (a) _____ (b) _____ (c) _____ (d) _____ (e) _____

BACKGROUND (a) _____ (b) _____ (c) _____ (d) _____ (e) _____

REMARKS _____

SURVEYOR (s) TTS DATE 6-30-84

MISC SMEARS

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM #6 4-24-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~CPM~~	d/m/100cm^2	~~CPM~~	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
9 8/2 B 19												
E, 21	Light	2	<18	40	<550	0.010			1.0	2.9	3.0	5.6
F, 21	PIPE	4	27	46	<550	0.010			1.0	2.9	1.5	2.8

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + GM (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M - 10 uR/h

SURVEYOR(s) TJS DATE 6-20

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 7 A-424

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/6 m	d/m/100cm²	c/6m	d/m/100cm²	mrad/hr	c/m	uR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
C 21	FLOOR BLOCK 8			ESG BLOCK 25,2 (RSPEAT)									
	a	2	<18	50	<550	0.010							
α 3|4	b	4	27	32	<550	0.010							F 23
B 5|4	c	4	27	60	880	0.024			0	0	30	5.6	
	d	4	27	52	<550	0.010							
	e	2	<18	58	792	0.023							
D-6	FLOOR BLOCK ESG			7,2	BLOCK 2	(RSPEAT)							
	c	4	27	80	1760	0.039							
α 3|4	b	10	81	74	1496	0.034							
B 5|4	c	0	<18	66	1144	0.029							
	d	2	<18	52	<550	0.010							
	e	6	45	56	704	0.021			1.5	4.3	2.5	4.6	F 14
D-6 →	D-9 NORTH WALL			BLOCK 6									
	a	2	18	38	<550	0.010							
α 8|2	b	12	99	32	<550	0.010			4.0	11.4	4.5	8.3	N 38
B 1|9	c	8	63	28	<550	0.010							
	d	0	<18	36	<550	0.010							
	e	4	27	34	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + 6m (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1m - 10 uR/h

SURVEYOR(s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 7 A-424

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/6 m	d/m/100cm²	c/6m	d/m/100cm²	mrad/hr	c/m	uR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
D-3 →	D-0 SOUTH WALL			BLOCK 9									
	a	2	<18	36	<550	0.010							
α 8|2	b	6	45	34	<550	0.010							
B 1|9	c	10	81	36	<550	0.010			3.5	10.0	3.5	6.5	S 37
	d	4	27	46	<550	0.010							
	e	0	<18	34	<550	0.010							
C-0	CEILING	ESG BLOCK 3,2 (RSPEAT)											
	a	2	<18	42	<550	0.010							
α 8|2	b	2	<18	36	<550	0.010							
B 1|9	c	8	63	42	<550	0.010			0.5	1.4	2.0	3.7	C 36
	d	4	27	50	<550	0.010							
	e	6	45	36	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + 6m (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1m - 10 uR/h

SURVEYOR(s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

Hot spots

FACILITY ESG BLDG. 004 ROOM #7 A-424

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
		NONE										

INSTRUMENTS USED (a) (b) (c) (d) (e)

BACKGROUND (a) (b) (c) (d) (e)

REMARKS

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

Misc. Smears

FACILITY ESG BLDG. 004 ROOM #7 A-424

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~c/.5m~~ CPM	d/m/100cm²	~~c/.5m~~ CPM	d/m/100cm²	mrad/hr	c/m	uR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
T-8/2 B-1/9												
C, 0	Fire Hose Rack	30	261	52	<550	0.010			1.0	2.9	2.0	3.7
C, 15	Coat Rack	4	27	30	<550	0.010			6.0	17.1	7.5	13.9

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS Average Gamma measurement at 1 m - 10 µR/h

SURVEYOR(s) TJS DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 8 423-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS ALPHA(a) c/ m	ALPHA(a) d/m/100cm²	BETA (b) c/ m	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears) ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
A 21	FLOOR	ESG BLOCK		1,2	(RESRAT)								
	a	2	<18	60	880	0.024							
α 3/4	b	4	27	72	1408	0.033			0	0	3.0	5.6	F 25
B 5/4	c	2	<18	40	<550	0.010							
	d	2	<18	44	<550	0.010							
	e	4	27	58	792	0.023							
C-21	FLOOR	BLOCK 4											
	a	2	<18	56	704	0.021							
α 3/4	b	12	99	74	1496	0.034							
B 5/4	c	0	<18	54	616	0.020							
	d	0	<18	322	<550	0.010			1.0	2.9	5.0	9.3	F 24
	e	6	45	48	<550	0.010							
A-18 → A-21	NORTH	WALL		ESG	BLOCK	3,2	(RESRAT)						
	a	2	<18	42	<550	0.010							
α 8/2	b	2	<18	50	<550	0.010			0.5	1.4	10.0	18.5	N 15
B 1/9	c	2	<18	38	<550	0.010							
	d	0	<18	22	<550	0.010							
	e	2	<18	32	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 2αS (b) PRS-1 + Gm (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 µR/h

SURVEYOR(s) LLS/TJS/KSP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM 8 423-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS ALPHA(a) c/ m	ALPHA(a) d/m/100cm²	BETA (b) c/ m	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears) ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
C-21 →	C-18	SOUTH	WALL	BLOCK 6									
	c	2	<18	44	<550	0.010			1.0	2.9	4.5	8.3	S 13
α 8/2	b	4	27	40	<550	0.010							
B 1/9	c	2	<18	32	<550	0.010							
	d	0	<18	34	<550	0.010							
	e	2	<18	36	<550	0.010							
B-18 →	C-18	EAST	WALL	ESG	BLOCK	7,2	(RESRAT)						
	c	0	<18	40	<550	0.010							
α 8/2	b	4	27	42	<550	0.010			0.5	1.4	2.5	4.6	E 14
B 1/9	c	2	<18	32	<550	0.010							
	d	2	<18	30	<550	0.010							
	e	2	<18	40	<550	0.010							
C-18 →	B-18	WEST	WALL	BLOCK 4									
	c	4	27	32	<550	0.010							
α 8/2	b	2	<18	42	<550	0.010							
B 1/9	c	2	<18	56	704	0.021							
	d	2	<18	40	<550	0.010							
	e	4	27	30	<550	0.010			0	0	1.5	2.8	W 12

INSTRUMENTS USED (a) PRS-1 + 2αS (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m = 10 µR/h

SURVEYOR(s) LLS/TJS/KSP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLOG 004 ROOM 8 423-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/5 m	d/m/100cm²	c/5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
A-21	CEILING	BLOCK		9								
	a	2	<18	22	<550	0.010						
α 8/2	b	4	27	44	<550	0.010						
B 1/9	c	6	45	56	704	0.021						
	d	4	27	60	880	0.024			0	0	3.5	6.5
	e	8	63	28	<550	0.010						

C 16

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + 6m (c) PRM 6 + NaI (d) LB5100 (e) LB5150

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE Gamma EXPOSURE AT 1m - 10 µR/h

SURVEYOR(s) LLS/TJS/KSP/BZ/BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

Hot Spots

FACILITY ESG BLOG 004 ROOM #8 423-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~cpm~~ c/5m	d/m/100cm²	~~cpm~~ c/5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²
α 8/2												
B 1/9												
									6	0	2.5	4.6
C,21	F	8	63	288/5m	10,912	0.189	clean up -		7	54	37/5m	2068
												0.044m rad/hr

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + 6m (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE Gamma MEASUREMENT AT 1m - 10 µR/h

SURVEYOR(s) TJS DATE 6-20-84

Misc. Smears

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLOG. 004 ROOM #8 423-82

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) cpm	ALPHA(a) d/m/100cm²	BETA (b) cpm	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
α 0/2												
B 1/9												
A, 21	K. Vent	2	<18	46	<550	0.010			1.0	2.9	5.5	10.2
C, 21	light	2	<18	42	<550	0.010			0	0	2.5	4.6

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + Gm (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE Gamma MEASUREMENT At 1 m - 10 uR/h

SURVEYOR (s) TJS DATE 6-20-84

Drains

CONTAMINATION SURVEY SUMMARY

FACILITY ESG 004 ROOM #8

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) cpm	ALPHA(a) d/m/100cm²	BETA (b) cpm	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
α 7/10												
B 9/2												
B, 18	drain	0	<18	44	<500	0.010			1.0	2.9	5.0	9.3

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + Gm (c) PRM 6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.5 cpm (e) 1.2 cpm

REMARKS AVERAGE Gamma MEASUREMENT AT 1M - 10 uR/h

SURVEYOR (s) TJS DATE 6-20

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 9 4-23-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm²	c/ m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
B-18	FLOOR ESG BLOCK 3,6 (RSPSAT)												
	a	12	99	58	792	0.023			0	0	2.0	3.7	F 27
α 3|4	b	2	<18	70	1320	0.031							
B 5|4	c	2	<18	70	1320	0.031							
	d	6	45	58	792	0.023							
	e	0	<18	68	1232	0.030							
A-18	FLOOR ESG BLOCK 5-7 (RSPSAT)												
	a	2	<18	50	<550	0.010							
α 3|4	b	0	<18	66	1144	0.029			0	0	3.0	5.6	F 28
B 5|4	c	2	<18	56	704	0.021							
	d	2	<18	56	704	0.021							
	e	4	27	56	704	0.021							
A-15 →	A-18 NORTH WALL ESG BLOCK 1,2 (RSPSAT)												
	a	2	<18	22	<550	0.010							
α 8|2	b	2	<18	72	1408	0.033			0.5	1.4	4.0	7.4	N 20
B 1|9	c	0	<18	36	<550	0.010							
	d	0	<18	44	<550	0.010							
	e	2	<18	8	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 7os (b) PRS-1 + GM (c) PRM-6 + NaI (d) LBS 100 (e) LBS 100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3 000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m - 10 µR/h

SURVEYOR (s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM 9 4-23-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/ m	d/m/100cm²	c/ m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
C-18 →	C-15 SOUTH WALL BLOCK 6												
	a	2	<18	24	<550	0.010			0	0	3.0	5.6	S 18
α 8|2	b	2	<18	32	<550	0.010							
B 1|9	c	0	<18	48	<550	0.010							
	d	0	<18	32	<550	0.010							
	e	0	<18	54	616	0.020							
B-15 →	C-15 EAST WALL BLOCK 7												
	a	4	27	30	<550	0.010							E
α 8|2	b	2	<18	52	<550	0.010			0	0	2.0	3.7	19
B 1|9	c	0	<18	40	<550	0.010							
	d	2	<18	48	<550	0.010							
	e	2	<18	34	<550	0.010							
C-15 →	B-15 WEST WALL ESG BLOCK 3,2 (RSPSAT)												
	a	6	45	30	<550	0.010							
α 8|2	b	2	<18	34	<550	0.010							W
B 1|9	c	8	63	42	<550	0.010			4.0	11.4	6.0	11.1	17
	d	0	<18	36	<550	0.010							
	e	2	<18	22	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 7os (b) PRS-1 + GM (c) PRM-6 + NaI (d) LBS 100 (e) LBS 120

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1M - 10 µR/h

SURVEYOR (s) LLS / TJS / KEP / BZ / BW DATE 6-19-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM #9 423-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/ 5 m	d/m/100cm^2	c/ 5m	d/m/100cm^2	mrad/hr	c/m	μR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
A-18	CEILING	ESG	BLOCK	3,2	(REPEAT)							
	c	2	<18	50	<550	0.010						
d 8/2	b	0	<18	42	<550	0.010						
B 1/9	c	0	<18	54	616	0.020						
	d	2	<18	64	1056	0.027						
	e	6	45	46	<550	0.010			1.5	4.3	2.5	4.6

INSTRUMENTS USED (a) PRS-1 + 2nS (b) PRS-1 + GM (c) PRM6 + NaI (d) LBS100 (e) LBS100

BACKGROUND (a) 1cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1m - 10 μR/h

SURVEYOR(s) LLS/KEP/BZ/BW DATE 6-19-84

Hot spots

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG. 004 ROOM #9 423-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		c/.5 m	d/m/100cm^2	c/.5m	d/m/100cm^2	mrad/hr	c/m	μR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
		NONE										

INSTRUMENTS USED (a) (b) (c) (d) (e)

BACKGROUND (a) (b) (c) (d) (e)

REMARKS

SURVEYOR(s) TJS DATE 6-20-84

Misc. Smears.

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLDG 004 ROOM #9 423-76

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~CPM @ 5 cm~~	d/m/100cm^2	~~CPM @ 5 cm~~	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
A 8/2												
B 1/9												
A, 18	east rack	2	<18	44	<550	0.010			3.0	8.5	4.5	8.3
B, 18	east light	6	45	48	<550	0.010			1.5	2.8	6.5	12.0

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA EXPOSURE AT 1M - 10 uR/h

SURVEYOR (s) TJS DATE 6-20-84

Drains

CONTAMINATION SURVEY SUMMARY

FACILITY ESG 004 ROOM #9

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)			
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)	
		~~CPM @ 5 cm~~	d/m/100cm^2	~~CPM @ 5 cm~~	d/m/100cm^2	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm^2	c/m	d/m/100cm^2
A 7/10												
B 10/2	floor	4	27	50	<550	0.010			1.0	2.9	3.5	6.5

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + GM (c) PRM6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m - 10 uR/h

SURVEYOR (s) TJS DATE 6-20

CONTAMINATION SURVEY SUMMARY

FACILITY ESG 004 ROOM #11 4/1-58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) cpm	ALPHA(a) d/m/100cm²	BETA (b) cpm	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
B-3	FLOOR ESG BLOCK 2,5 (REPEAT)												
	a	8	63	44	<550	0.010							
∝ 7/10	b	0	<18	48	<550	0.010							
B 10/2	c	2	<18	132	4048	0.076			0	0	3.0	5.6	F 39
	d	6	45	38	<550	0.010							
	e	2	<18	40	<550	0.010							
B-6	FLOOR ESG BLOCK 6,5 (REPEAT)												
	a	2	<18	24	<550	0.010							
∝ 7/10	b	2	<18	38	<550	0.010							
B 10/2	c	0	<18	44	<550	0.010							
	d	2	<18	56	704	0.021							
	e	4	27	58	792	0.023			.5	1.4	2.5	4.6	F 35
A 9	FLOOR BLOCK 7												
	a	2	<18	34	<550	0.010							
∝ 7/10	b	6	45	36	<550	0.010							
B 10/2	c	6	45	46	<550	0.010			0.5	1.4	3.5	6.5	F 36
	d	2	<18	42	<550	0.010							
	e	4	27	32	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + 6m (c) PRM-6 + NaI (d) LBS100 (e) LBS100

BACKGROUND (a) 10cpm (b) 40cpm (c) 3000cpm (d) 0.15cpm (e) 1.2cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m - 10uR/h

SURVEYOR(S) KEP/Wild Thang/BW DATE 6-20

CONTAMINATION SURVEY SUMMARY

FACILITY ESG BLD. 004 ROOM #11 4/1-58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) c/m	ALPHA(a) d/m/100cm²	BETA (b) c/m	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) uR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²	
A-3	FLOOR BLOCK 1			ESG BLOCK 1,1			(REPEAT)						
	a	0	<18	60	880	0.024							
∝ 7/10	b	0	<18	74	1496	0.034			0.5	1.4	4.0	7.4	F 37
	c	0	<18	46	<550	0.010							
B 10/2	d	2	<18	24	<550	0.010							
	e	0	<18	48	<550	0.010							
A-6	FLOOR BLOCK 7												
	a	8	63	38	<550	0.010							
∝ 7/10	b	12	99	38	<550	0.010			1.0	2.9	4.0	7.4	F 42
B 10/2	c	4	27	50	<550	0.010							
	d	2	<18	30	<550	0.010							
	e	4	27	40	<550	0.010							
A-0 → A-3	NORTH WALL			ESG BLOCK 1,2			(REPEAT)						
	a	6	45	46	<550	0.010							
∝ 7/10	b	0	<18	30	<550	0.010							
B 10/2	c	6	45	16	<550	0.010							
	d	2	<18	46	<550	0.010			0	0	2.5	4.6	N 38
	e	4	27	30	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + 6m (c) PRM-6 + NaI (d) LBS100 (e) LBS100

BACKGROUND (a) 1cpm (b) 40cpm (c) 3000cpm (d) 0.15cpm (e) 1.2cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1m: 10uR/h

SURVEYOR(S) KP/BZ DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG 004 ROOM #11 411-58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
C9→C-6	SOUTH WALL			BLOCK 9									
	a	2	<18	56	704	0.021							
	b	4	27	38	<550	0.010							
	c	4	27	44	<550	0.010							
	d	4	27	30	<550	0.010							S 40
	e	4	27	46	<550	0.010			0	0	3.0	5.6	
B6→C-6	EAST WALL ESG			BLOCK 4, 1 (REPEAT)									
	a	6	45	58	792	0.023							
	b	6	45	44	<550	0.010							
	c	4	27	32	<550	0.010							
	d	6	45	58	792	0.023							E 41
	e	12	99	30	<550	0.010			0.5	1.4	1.0	1.9	
C-0→B-0	WEST WALL			ESG BLOCK 1, 3 (REPEAT)									
	a	4	27	34	<550	0.010							
	b	2	<18	48	<550	0.010							
	c	2	<18	24	<550	0.010							
	d	8	63	34	<550	0.010							W 39
	e	8	63	42	<550	0.010			0.5	1.4	8.0	14.8	

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + Gm (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1cpm (b) 40cpm (c) 3,000 cpm (d) 0.15cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 m - 10 uR/h

SURVEYOR(s) KEP / BZ DATE 6-20-84

CONTAMINATION SURVEY SUMMARY

FACILITY ESG 004 ROOM 11 411-58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS							REMOVABLE CONTAMINATION (Smears)				
		ALPHA(a)		BETA (b)			GAMMA (c)		ALPHA (d)		BETA-GAMMA (e)		
		c/.5 m	d/m/100cm²	c/.5m	d/m/100cm²	mrad/hr	c/m	µR/h @ 1 meter	c/m	d/m/100cm²	c/m	d/m/100cm²	
A-6	CEILING			BLOCK 7									
	a	2	<18	64	1056	0.027							
	b	6	45	46	<550	0.010							
	c	8	63	48	<550	0.010			0	0	4.0	7.4	C 51
	d	10	81	50	<550	0.010							
	e	0	<18	36	<550	0.010							

INSTRUMENTS USED (a) PRS-1 + 20S (b) PRS-1 + Gm (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 1.2 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1m - 10 uR/h

SURVEYOR(s) KP / BZ DATE 6-20-84

CONTAMINATION SURVEY SUMMARY — miscellaneous smears

FACILITY ESG BLDG. 004 ROOM 11 4/1 - 58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) ~~cpm~~	ALPHA(a) d/m/100cm²	BETA (b) ~~cpm~~	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
C - 3		-										
Smear #75	pipe	4	27	30	<550	0.010			0	0	4.5	8.3
" #72	pipe	2	<18	44	<550	0.010			0.5	1.4	3.5	6.5
" 78	pipe	4	27	48	<550	0.010			0	0	1.5	2.8

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) _____ (b) _____ (c) _____ (d) _____ (e) _____

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 uR/h

SURVEYOR(s) RCW DATE 6-20-84

CONTAMINATION SURVEY SUMMARY — miscellaneous smears

FACILITY ESG BLDG. 004 ROOM 11 4/1 - 58

GRID BLOCK	POINT	DIRECT PROBE MEASUREMENTS: ALPHA(a) ~~cpm~~	ALPHA(a) d/m/100cm²	BETA (b) ~~cpm~~	BETA (b) d/m/100cm²	BETA (b) mrad/hr	GAMMA (c) c/m	GAMMA (c) µR/h @ 1 meter	REMOVABLE CONTAMINATION (Smears): ALPHA (d) c/m	ALPHA (d) d/m/100cm²	BETA-GAMMA (e) c/m	BETA-GAMMA (e) d/m/100cm²
A - 3												
Smear #76	power box	4	27	44	<550	0.010			0	0	2.5	4.6
A - 6												
Smear #82	equipment	10	81	36	<550	0.010			1.0	2.9	4.0	7.4
" #70	drawer	0	<18	34	<550	0.010			0.5	1.4	4.5	8.3
" 81	AIC system	4	27	62	968	0.026			0	0	2.5	4.6
B - 3												
Smear #80	window frame	12	99	48	<550	0.010			2.5	7.1	4.5	8.3
" #79	collar valve	2	<18	34	<550	0.010			0.5	1.4	2.0	3.7
" 77	drawer	0	<18	44	<550	0.010			0	0	1.5	2.8
" 73	pipe bracket	2	<18	32	<550	0.010			0.5	1.4	1.5	2.8
" 71	equipment	2	<18	44	<550	0.010			1.5	4.3	4.0	7.4
B - 6												
Smear #74	equipment	16	135	54	616	0.020			2.0	5.7	3.5	6.5

INSTRUMENTS USED (a) PRS-1 + ZnS (b) PRS-1 + GM (c) PRM-6 + NaI (d) LB5100 (e) LB5100

BACKGROUND (a) 1 cpm (b) 40 cpm (c) 3,000 cpm (d) 0.15 cpm (e) 12 cpm

REMARKS AVERAGE GAMMA MEASUREMENT AT 1 M = 10 uR/h

SURVEYOR(s) RCW DATE 6-20-84