

CLOSE-OUT RADIATION SURVEY REPORT

For: Kay Ray, Inc.
516 West Campus Drive
Arlington Heights, Illinois 60004-9985

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Appendix A

1. Radiation Survey Personnel

Al Peterson, Radiation Safety Officer of Kay Ray, Inc., with Kay Ray personnel under his direct supervision, performed preliminary radiation surveys and discovered fixed contamination in the Engineering Lab. Stan A. Huber of S. A. Huber Consultants, Inc. (NRC License #12-17503-01) and Herb Huber, Decon Services Manager of ADCO Services (NRC License #12-11286-01) supervised the decontamination and performed the final close-out radiation survey on December 22, 1986.

2. Instruments Used and Methods

- a) One (1) Ludlum Model 19 Micro R meter, serial #42966, calibrated August 1, 1986 (ADCO) for building walk through survey and outside building survey to detect any sealed sources or major contamination.
- b) Two (2) Ludlum Model 2 multiprobe floor monitors, serial #43162 and #43179, (ADCO) were used in detailed overlapping sweep paths throughout every room in the Kay Ray building, to detect any contamination on the floors. Normal background on these instruments registers about 2 K CPM and a 7 μ Ci Cesium-137 standard produced about 200 K CPM, so minimum detectable activity would be about 0.1 μ Ci for Cesium-137.
- c) Two (2) Ludlum Model 14-C survey meters with 44-9 thin window pancake probes (ADCO), used to survey surfaces of wall and materials, and to confirm clean up of contaminated spots.
- d) One (1) Packard Model 5230 Auto Gamma well counter (SAHCI) with a 26.7% counting efficiency for Cs-137, used for counting soil samples of the polar coordinates of the Kay Ray buildings (see Appendix C) and Engineering Lab wipe test samples (see Appendix D).

All survey instruments used were last calibrated by SAHCI in August 1986. These instruments and all detection/sample counting instruments were operationally checked prior to each use.

Planned action levels for decontamination were as indicated in the 1982 NRC Draft Guide for Decontaminating and Decommissioning of Facilities, with an intent to remove any contamination to ALARA levels, or as near normal background as possible.

CLOSE-OUT RADIATION SURVEY REPORT

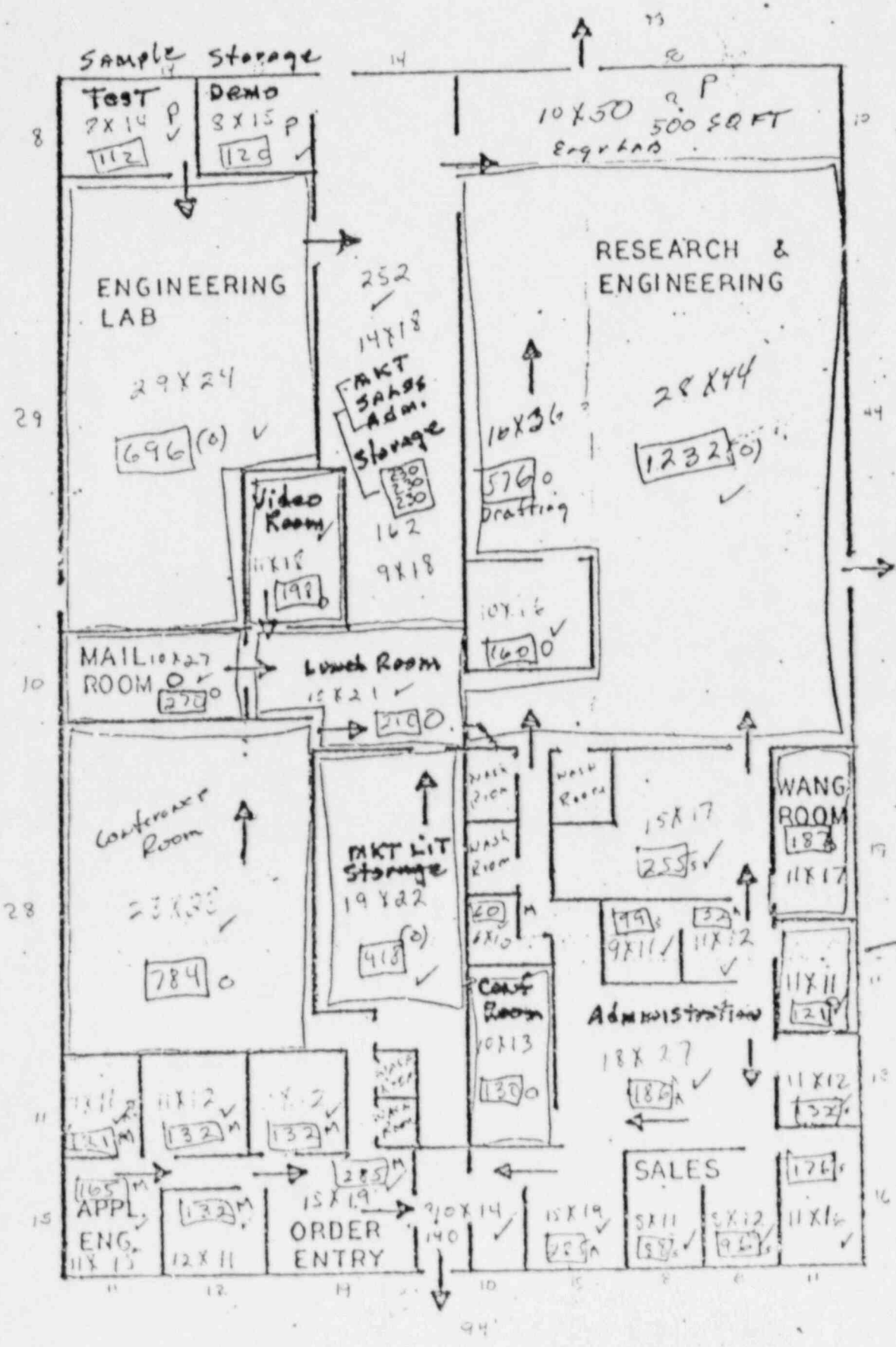
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Appendix B

FACILITY SKETCH and DESCRIPTION

The next page (sketch) shows the layout of the 516 West Campus Drive warehouse/office building, which is about 101 feet long by about 91 feet wide (9,191 ft²). The Administration and carpeted office areas face West Campus Drive and comprise about half the building. The back half of the building is primarily open warehouse type rooms (Engineering Lab, and Research and Engineering) with concrete slab or tile floors, with some carpeted areas in the Research area. The walls are concrete block with exterior brick facing.

The contamination found in the Engineering Lab was on the floor along the west wall (about 30 discrete spots) and on the west wall itself (about 6 discrete spots in a close pattern). Wipe tests showed the contamination was definitely fixed. The spots on the concrete floor were chiseled with protective cover to prevent spreading and the interior facing of about six concrete blocks were chiseled out to remove the contaminated spots. The contaminated concrete and all disposable materials used in the decontamination were placed in a rad waste barrel for transfer to ADCO Services, Inc.



516 W. CAMPUS DRIVE

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Appendix C

DESCRIPTION OF SOIL SAMPLES TAKEN and PRINT OUT RESULTS

The next three pages in this report show the analysis of the soil samples taken at the polar coordinates of the 506 and 516 Campus Drive buildings. The counts on the low energy page are for 20 to 150 kev, for medium energy 150 to 500 kev, and high energy 500 to 1500 kev. For the 506 building, it was not possible to take soil samples because an asphalt drive and concrete boundary wall occupy the entire space on that side of the 506 building.

The locations of the soil samples were chosen by Al Peterson and Stan Huber, as the most likely areas where materials could have been temporarily placed or where there were relatively high traffic patterns. The samples were about 20 cc in size and taken at depths of about six inches. Since Kay Ray primarily handles only Cesium-137 sealed sources, and Am/Be sealed sources on occasion, there was no indication to perform C-14, H-3 analysis or testing for other radionuclides.

The attached printouts show the highest reading (on page 3) was 7.9×10^{-5} uCi. In the event any samples would have shown greater variances or results approaching 5×10^{-3} uCi, we would have considered the need for more detailed evaluation.

BACKGROUND

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LOW ENERGY COUNTS

WIPE #	MAX. CPM	LESS BCKGRND EQUALS NET CPM	/EFF.0.568 EQUALS DPM	ACTIVITY (uCi)
506 BUILDING NE CORNER (DUMPSTER AREA)				
1	51	16	28	1.26901408E-5
2	60	25	44	1.98283451E-5
3	53	18	32	1.42764085E-5
506 BUILDING SOUTH SIDE (NEAR DRAIN)				
1	57	22	39	1.74489437E-5
2	50	15	26	1.18970070E-5
3	60	25	44	1.98283451E-5
506 BUILDING WEST SIDE				
1	63	28	49	2.22077465E-5
2	64	29	51	2.30008803E-5
3	58	23	40	1.82420775E-5
516 BUILDING NORTH SIDE				
1	46	11	19	8.72447183E-6
2	58	23	40	1.82420775E-5
3	53	18	32	1.42764085E-5
516 BUILDING SOUTH SIDE				
1	51	16	28	1.26901408E-5
2	61	26	46	2.06214789E-5
3	51	16	28	1.26901408E-5
516 BUILDING EAST SIDE				
1	43	8	14	6.34507042E-6
2	55	20	35	1.58626761E-5
3	60	25	44	1.98283451E-5
516 BUILDING WEST SIDE				
1	59	24	42	1.90352113E-5
2	60	25	44	1.98283451E-5
3	61	26	46	2.06214789E-5

CONTINUED ON PAGE 2 WITH NEW BACKGROUND

BACKGROUND

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MEDIUM ENERGY COUNTS

WIPE #	MAX. CPM	LESS BCKGRND EQUALS NET CPM	/EFF.0.66 EQUALS DPM	ACTIVITY (uCi)
506 BUILDING NE CORNER (DUMPSTER AREA)				
1	101	40	61	2.73030303E-5
2	96	35	53	2.38901515E-5
3	59	0	0	.000001
506 BUILDING SOUTH SIDE (NEAR DRAIN)				
1	98	37	56	2.52553030E-5
2	75	14	21	9.55606061E-6
3	89	28	42	1.91121212E-5
506 BUILDING WEST SIDE				
1	89	28	42	1.91121212E-5
2	103	42	64	2.86681818E-5
3	117	56	85	3.82242424E-5
516 BUILDING NORTH SIDE				
1	85	24	36	1.63818182E-5
2	87	26	39	1.77469697E-5
3	77	16	24	1.09212121E-5
516 BUILDING SOUTH SIDE				
1	80	19	29	1.29689394E-5
2	96	35	53	2.38901515E-5
3	83	22	33	1.50166667E-5
516 BUILDING EAST SIDE				
1	89	28	42	1.91121212E-5
2	95	34	52	2.32075758E-5
3	94	33	50	.000022525
516 BUILDING WEST SIDE				
1	88	27	41	1.84295455E-5
2	77	16	24	1.09212121E-5
3	81	20	30	1.36515152E-5

CONTINUED ON PAGE 3 WITH NEW BACKGROUND

BACKGROUND

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HIGH ENERGY COUNTS

WIPE #	MAX. CPM	LESS BCKGRND EQUALS NET CPM	/EFF.0.267 EQUALS DPM	ACTIVITY (uCi)
506 BUILDING NE CORNER (DUMPSTER AREA)				
1	62	11	41	1.85599251E-5
2	82	31	116	5.23052434E-5
3	55	4	15	6.74906367E-6
506 BUILDING SOUTH SIDE (NEAR DRAIN)				
1	61	10	37	1.68726592E-5
2	56	5	19	8.43632959E-6
3	77	26	97	4.38689139E-5
506 BUILDING WEST SIDE				
1	82	31	116	5.23052434E-5
2	72	21	79	3.54325843E-5
3	98	47	176	7.93014981E-5
516 BUILDING NORTH SIDE				
1	70	2	7	3.37453184E-6
2	66	15	56	2.53089888E-5
3	55	4	15	6.74906367E-6
516 BUILDING SOUTH SIDE				
1	75	24	90	4.04943820E-5
2	83	32	120	5.39925094E-5
3	62	11	41	1.85599251E-5
516 BUILDING EAST SIDE				
1	87	36	135	6.07415730E-5
2	75	24	90	4.04943820E-5
3	63	12	45	2.02471910E-5
516 BUILDING WEST SIDE				
1	72	21	79	3.54325843E-5
2	63	12	45	2.02471910E-5
3	59	8	30	1.34981273E-5

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Appendix D

DESCRIPTION OF BUILDING RADIATION SURVEY and PRINTOUT RESULTS AFTER DECONTAMINATION

Appendix A of this report describes the personnel, instruments, and methods used in performing the radiation survey of the 516 West Campus Drive building and its immediate environs.

The survey of floors and wall surfaces throughout the building, as well as ground surface and exterior walls, showed uniform normal background radiation readings (less than 0.04 mr/hr), except for the Engineering lab room. The extent of contamination found in that room, and the removal methods, were described in Appendix B. The typical reading of most of the contaminated spots ranged between 0.15 mr/hr to 2 mr/hr. The contaminated spots on the wall were between 0.2 to 4 mr/hr, with one spot giving a reading of 32 mr/hr at surface. This was the maximum reading found. Small samples of the contaminated concrete (which gave slight readings above normal background) were analyzed in the Packard auto-gamma counter to confirm the contamination was Cesium-137.

After the contaminated spots in the Engineering Lab were removed to rad waste, the area was resurveyed and a few additional spots below 0.2 mr/hr were removed. Upon final survey, the cleaned floor and wall in the Engineering Lab room showed readings of less than 0.1 mr/hr, which was considered ALARA. The final wipe test (38) results are attached, which show that any very low level contamination which could be remaining, would definitely be fixed contamination.

KAY RAY INC.

ARLINGTON HEIGHTS, ILLINOIS

PAGE 1

BACKGROUND

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CESIUM COUNTS

WIPE #	MAX. CPM	LESS BCKGRND EQUALS NET CPM	/EFF.0.267 EQUALS DPM	ACTIVITY (uCi)
63-1	56	0	0	.000001
64-2	70	5	19	8.43632959E-6
65-3	58	0	0	.000001
66-4	51	0	0	.000001
67-5	62	0	0	.000001
68-6	51	0	0	.000001
69-7	50	0	0	.000001
70-8	49	0	0	.000001
71-9	53	0	0	.000001
72-10	52	0	0	.000001
73-11	64	0	0	.000001
74-12	61	0	0	.000001
75-13	51	0	0	.000001
76-14	46	0	0	.000001
77-15	40	0	0	.000001
78-16	43	0	0	.000001
79-17	51	0	0	.000001
80-18	52	0	0	.000001
81-19	56	0	0	.000001
82-20	65	0	0	.000001
83-21	51	0	0	.000001
84-22	53	0	0	.000001
85-23	46	0	0	.000001
86-24	53	0	0	.000001
87-25	43	0	0	.000001
88-26	58	0	0	.000001
89-27	54	0	0	.000001
90-28	53	0	0	.000001
91-29	51	0	0	.000001
92-30	55	0	0	.000001
93-31	58	0	0	.000001
94-32	47	0	0	.000001
95-33	47	0	0	.000001
96-34	46	0	0	.000001
97-35	54	0	0	.000001
98-36	53	0	0	.000001
99-37	67	2	7	3.37453184E-6
100-38	57	0	0	.000001

Background = 65 CPM

The above wipe tests are of the Kay Ray, Inc. Engineering Lab Room, performed on December 22, 1986 after decontamination activities. Samples were counted on Cesium-137 settings on SAHCI Packard auto-gamma well counter



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APPENDIX E

CONCLUSION

This report shows that a thorough radiation survey was performed and Cesium-137 contamination was successfully removed. Final radiation survey readings were less than 0.1 mr/hr and final wipe test readings showed maximum removable contamination at 19 DPM per 100 cm², which is well below permissible levels in the NRC Draft Guidelines for Decontamination and Decommissioning of Facilities.

It is our conclusion that this facility is now acceptable for release for unrestricted use and that the license for the 516 West Campus Drive location can be terminated.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Stan A. Huber".

Stan A. Huber
President

December 28, 1986