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Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO: Al Cucchiara, HSE-10, MS G749

FROM: Keith Olson, *[Signature]*
Radiation Projection Management

SYMBOL: HSE-10-91:CMR-102

SUBJECT: WING 1 5480.11 FINAL REPORT

DATE: May 13, 1991

MAIL STOP/TELEPHONE: G749/7-4093

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Reference:

- 1) Internal Memorandum, DOE 5480.11 PRELIMINARY WING 1 SURVEY REPORT (HSE-10-91:41)
- 2) Memorandum from James D. Watkins to Operation Office Managers, Control of Radioactive Contamination, Dated June 6, 1990.

INTRODUCTION

We have completed the 5480.11 survey for Wing 1. All area(s)/item(s) requested by the 5480.11 committee have been thoroughly surveyed and documented. Decontamination/disposal of contaminated items has been accomplished.

The wing 1 survey was started on 8/13/90 and completed 9/18/90. However, the follow-up surveys were not completed until 2/18/91. We received the final set of smear samples for wing 1 on 1/13/91. A total of 5,495 smears were taken from wing 1 and total of 465 smears were taken during the follow-up surveys. There were a total 122 items found to have fixed contamination and 43 items with smearable contamination in excess of the limits specified in DOE ORDER 5480.11 (AR 3-7).

The following area(s)/item(s) were not included in the 5480.11 survey: Hallways, Access panels, Men's and women's change rooms, Janitor closets, Wall lockers and item(s) stored in wing 1 hallways and room 1116. If our contract is renewed, we will include those areas in our survey according to your request of April 15, 1991.

QUALITY ASSURANCE/QUALITY CONTROL PROGRAM

We submitted a request to RPM headquarter that an audit be performed on the 5480.11 survey documentation results. The audit was conducted in November of 1990, by

MASTER

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William A. Wadman III. This audit consisted of the following: Compliance with INPO guidelines, NRC regulations, ANSI and ANS standards, and DOE ORDERS. The only deficiency noted was the lack of a quality assurance/quality control (QA/QC) program. As you are aware, we instituted a QA/QC program for the 5480.11 survey documentation. All survey records are QA/QCed prior to the records being transferred to HSE-10 for archiving. As each page of the survey record is thoroughly reviewed for regulatory compliance and completeness, the page is stamped with the QA/QC stamp (see figure 1) to indicate it has been properly completed and reviewed.

HSE-10 DOCUMENT REVIEW	
Name (Printed):	_____
Signature:	_____
Date:	_____
Additional Action?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Date Of Closure:	_____
Initials:	_____

Figure 1, HSE-10 QA/QC Stamp

SURVEY TECHNIQUE

Surveys consisted of Large Area Smears (LAS), and Direct Surveys (DS) of all items and Smear Surveys. Each survey was documented on the appropriate Los Alamos National Laboratory form.

LAS Surveys: This survey consisted of using a cloth of maslinn and attaching it to a dry mop head. The entire surface, such as the floor, walls or desk top is wiped and the cloth is removed from the mop head. Each large area smear was direct surveyed using both a Ludlum-139 and ESP-1/HP-260 beta/gamma survey instruments to locate any gross contamination. If the LAS was less than 1000 dpm beta/gamma and less than 100 to 200 dpm alpha DS, the area is assumed to be free of contamination. If the LAS was found to be above the limits specified, the area was resurveyed using 47 mm. cloth smears and the activity is quantified. Large Area Smears were used as backup data

for smear surveys and provided an indication of low level dispersed contamination problems.

Smear Surveys: 100 cm² smear surveys were performed on all items in the offices. Due to the enormous amount of books and manuals in each office, random pages in each book/manual were smeared. Log books have a high probability of being contaminated and warrant special consideration. Each page was smeared and the entire outer surface checked. Smears were taken to obtain representative samples as part of a total survey for surface contamination as a sensitive method of finding contamination.

If smear results are above limits, we re-smeared the applicable areas and count the smears using the Eberline SAC-4 alpha counter and ESP-1/HP-210 beta/gamma instrument. The second set of smears will determine the exact location of contamination.

Direct Surveys: All items were checked for fixed surface contamination. Direct monitoring of surfaces for total surface contamination was accomplished by making sequential measurements over the surface with a stationary detector or by slowly sweeping the detector over the surface. Direct surveys were conducted in accordance with ANSI N13.12 Section 4.2.

Note: The RPM philosophy on loose contamination is as follows: All items were smear surveyed, however, while direct surveying an item, if the item was found to have direct readings greater than 1000 dpm beta/gamma or greater than lowest level of detection (100 to 200 dpm) for alpha, the item was immediately smear surveyed and checked for loose contamination using the hand-instruments. The specific location of the high reading from the direct survey is also smeared. If the original smear is less than 1,000 dpm/100 cm² beta/gamma or less than 100 to 200 dpm/100 cm² alpha then the item is remarked and the smear is sent to HPAL for analysis. If the item showed positive results, then an attempt to decontaminate the item was made. Two attempts were made to bring the item down to less than 1,000 dpm/100 cm² and less than 100 to 200 dpm/100 cm² alpha. If we were able to decontaminate the item, follow up smears were taken and sent to HPAL for laboratory counting. If we were unable to decontaminate the item, it was marked/bagged as radioactive contamination. This decontaminate effort was made in attempt to prevent cross-contamination.

Large items were given special consideration in attempt to reduce the volume of radioactive waste.

All instruments were source checked according to Los Alamos National Laboratory procedures and the applicable ANSI standard. Instrument calibration and source checks were conducted as documented in reference # 1.

We believe our survey approach is consistent with your effort to comply with DOE ORDER 5480.11 and reference #2.

TERMINOLOGY

Minimum Detectable Activity (MDA): Since counting intervals cannot be made indefinitely long, the length of counting time and background were used to determine minimum detectable activity. Since these limits are based on counting statistics alone and do not include errors from systematic components that are always inherent in counting procedures, the use of "MDA" is limited to that of serving as guideposts only. MDA does not pertain to absolute levels of activity that can or cannot be detected by a counting and detection limit. The term as used in this document represents the activity below the detection limit of the instrument for a counting time of 1 minute.

SURVEY RESULTS

Table I list all item(s) found to exceed AR 3-7 appendix C levels for fixed contamination levels. Table II list all item(s) in excess of the limits specified in AR 3-7 appendix C, removable contamination. Due to the fact that the CMR building has a wide variety of radionuclides, we have taken the conservative approach of using 20 dpm/100 cm² for alpha and 1,000 dpm/100 cm² for beta/gamma removable limits. We are using 300 dpm/100 cm² alpha and 5,000 dpm/100 cm² beta/gamma for fixed + removable contamination limits.

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Table I
DIRECT SURVEY USING ESP-1/HP-260, LUD-139

The results of the direct survey (DS) are that the item(s) were found to less than the limits specified in AR 3-7 Appendix C, except for those listed in Table I.

Office	Contaminated Items(s)	Alpha (dpm/100 cm ²)	B/G (dpm/100 cm ²)
1114	Bolts from cabinet #2, 5th drawer	< MDA	2,000
	Sample from cabinet #2, 2nd drawer	< MDA	4,000
	Sample of U ²³⁵	< MDA	9,000
	Sample of UO ₂	< MDA	3,000
	Top of cabinet	< MDA	2,000
	Sink, right ledge	< MDA	600
1125	None	< MDA	< MDA
1126	None	< MDA	< MDA
1127	Cart	< MDA	5,000
1128	None	< MDA	< MDA
1129	Desk #2, right bottom drawer	< MDA	27,000
	Stainless steel cabinet top	< MDA	60,000
	Stainless steel sink	< MDA	100,000
	Far right sink cabinet base	< MDA	50,000
	Far left sink cabinet base	< MDA	50,000
	File cabinet #1, 3rd drawer	< MDA	20,000
	File cabinet #1, 5th drawer	< MDA	23,000
	Paper dispenser (large)	< MDA	8,000
	Glass beaker 40ml	< MDA	10,020
	Yellow powder in sample bottle	< MDA	360,000
	Red handled allen wrench	< MDA	9,000
1131	Typewriter P/N 671919	< MDA	30,000
	Typewriter stand	< MDA	30,000
	Chair (gray)	< MDA	300,000
	Chair (red)	< MDA	80,000
	Chair (green)	< MDA	100,000
	Chalk board eraser	< MDA	40,000
	Log book #1	< MDA	10,000
	Log book #2	< MDA	10,000
	Log book #3	< MDA	10,000
	Log book #4	< MDA	9,000
	Log book #5	< MDA	5,000
	Log book #6	< MDA	5,000
	Log book #7	< MDA	5,000

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Log book #8	< MDA	50,000
Metal paper tray	< MDA	10,000
Wood paper tray	< MDA	8,000
Large tape dispenser	< MDA	85,000
Tweezers #1	< MDA	5,000
Tweezers #2	< MDA	5,000
Tweezers #3	< MDA	5,000
Tweezers #4	< MDA	5,000
Gray box of U-235 source, 90 ea.	< MDA	240,000
Ink bottle	< MDA	21,000
Safety glasses	< MDA	15,000
Cryoresiter	< MDA	7,000
12" wood ruler	< MDA	16,000
Small tape dispenser	< MDA	6,000
Large metal square	< MDA	40,000
Electrical outlet	< MDA	15,000
Roll of tape	< MDA	5,000
Small metal Square	< MDA	24,000
File #1	< MDA	10,000
File #2	< MDA	10,000
Grinder/Cutter	< MDA	700,000
Cardboard box	< MDA	17,000
Solder Iron	< MDA	5,000
Electrical cord	< MDA	17,000
14"x36" wood drawing board	< MDA	6,000
24"x36" wood drawing board	< MDA	20,000
Wood box	< MDA	40,000
12" wood ruler	< MDA	5,000
Paper cutter	< MDA	40,000
Plastic stencil	< MDA	45,000
Black box of U-235 samples #1	< MDA	95,000
Black box of U-235 samples #2	< MDA	30,000
Black box of U-235 samples #3	< MDA	40,000
Black box of U-235 samples #4	< MDA	40,000
Black box of U-235 samples #5	< MDA	56,000
Black box of U-235 samples #6	< MDA	10,000
Black box of U-235 samples #7	< MDA	50,000
File cabinet #3, Bottom drawer	< MDA	45,000
File cabinet #3, 4th drawer	< MDA	10,000
File cabinet #3, 3rd drawer	< MDA	8,000
File cabinet #3, 2nd drawer	< MDA	15,000
File cabinet #3, top drawer	< MDA	42,000
Bottom of phone	< MDA	15,000
Radio handle	< MDA	10,000
Desk #2, top	< MDA	1.0e+6
Desk #2, top center desk drawer	< MDA	5,000
Desk #2, right drawer handle	< MDA	17,000

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	Desk #2, Middle right drawer	< MDA	70,000
	File on top of file cabinet #3	< MDA	5,000
	File cabinet #2, top drawer	< MDA	40,000
	File cabinet #2, drawer #2	< MDA	60,000
	File cabinet #2, drawer #3	< MDA	60,000
	File cabinet #2, drawer #4	< MDA	60,000
	File cabinet #2, drawer #5	< MDA	60,000
1132	None	< MDA	< MDA
1133	None	< MDA	< MDA
1134	Radioactive bolt	< MDA	87,000
	C-clamp	< MDA	10,000
	Micrometer case	< MDA	9,000
	Metal sample #4	< MDA	300,000
	Metal sample #5	< MDA	250,000
	Metal sample #6	< MDA	19 mrad/hr, .1 mr/hr gamma
	Metal sample #7	< MDA	7 mrad/hr, <.1 mr/hr gamma
	Metal sample #8	< MDA	10 mrad/hr, <.1 mr/hr gamma
	Metal sample #9	< MDA	10 mrad/hr, <.1 mr/hr gamma
	Metal sample #10	< MDA	4 mrad/hr, <.1 mr/hr gamma
	Metal sample #11	< MDA	10 mrad/hr, <.1 mr/hr gamma
	Metal sample #12	< MDA	10 mrad/hr, <.1 mr/hr gamma
	Metal sample #13	< MDA	9 mrad/hr, <.1 mr/hr gamma
	Bottom desk drawer	< MDA	40,000
	Blue lab coats	< MDA	6,000
	Green chair	< MDA	15,000
	Sources stored in office, highest reading, approximately 90 sources.	< MDA	70 mrad/hr, 4 mr/hr gamma
	Bottom drawer of safe	< MDA	4,000
1136	None	< MDA	< MDA
1140	Cardboard box	< MDA	4,000
	UAuPt ₄	< MDA	30,000
	Metal fragments	< MDA	800,000, 4 mrad/hr, <.1 mr/hr gamma
	Piece of metal	< MDA	1.3e+6, 8 mrad/hr, <.1 mr/hr gamma
	CuTh	< MDA	8,000
	Metal/Plastic	< MDA	6,000
	Box of URhGe ₂	< MDA	20,000
	Tape dispenser	500	7,000
	Labeled radioactive material - UCO ₂ jar	< MDA	250,000
1142	Small sample box of UPt ₃	< MDA	3,000
	Piece of metal (uranium) 24"x24"	200,000	100 mrad/hr, 4 mr/hr gamma
	18"x6" steel pipe	3,000	12,000
	18"x6" steel pipe	3,000	12,000

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TABLE II
HSE-1 HEALTH PHYSICS ANALYSIS LABORATORY SMEAR RESULTS

Room No.	Smear No.	Alpha Result (dpm/100 cm ²)	B/G Result (dpm/100 cm ²)	Item Smeared
1114		20	< MDA	Metal tray in left bottom cabinet, under sink
		41	< MDA	Cabinet #3, top right, small drawer
		72	< MDA	Cabinet #3, right side, slot #2
		77	< MDA	Cabinet #3, large slot
1129	106d	24	34	Cabinet #3, Bottom right drawer
	122d	23	310	Top of cabinet #2
	124d	27	278	Top of cabinet #2
	146d	20	113	Cabinet #2, drawer #3
	201d	27	165	Cabinet #1, Bottom left drawer
1131	5a	20	359	File cabinet #3, top drawer
	33a	52	1,288	File cabinet #3, 2nd drawer
	35a	23	< MDA	File cabinet #3, 2nd drawer
	152c	9	1,856	Floor
1133	33a	23	< MDA	1/2 desk #1, 4th shelf
	41a	26	19	1/2 desk #1, middle drawer
	44a	54	19	1/2 desk #1, middle drawer
1134	79b	28	21	Book case #1, 4th shelf
	80b	69	84	Book case #2, 4th shelf
	80c	95	84	Left middle desk drawer, desk #2
	80a	98	78	Shelf #3
	115a	25	29	File cabinet, top
	117a	117	92	File cabinet, top
	118a	236	222	File cabinet, top
	172a	32	67	Stand #1, upper
	40c	59	94	Table #1
	171b	28	109	Desk #2, right bottom drawer
	173b	54	134	Desk #2, right bottom drawer
	174b	28	142	Desk #2, right bottom drawer
	175b	28	77	Desk #2, right bottom drawer
	179b	32	44	Desk #2, right bottom drawer
1136	172b	28	109	Right bottom desk #2, drawer
	173b	54	134	Right bottom desk #2, drawer
	174b	28	142	Right bottom desk #2, drawer
	175b	28	79	Right bottom desk #2, drawer
	179b	32	44	Right bottom desk #2, drawer
	116b	21	19	Book on desk #2
	79b	28	21	Book case #1, 4th shelf
	80b	69	84	Book case #1, 4th shelf

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1138	41c	28	72	Wall
	36c	28	47	Desk #2
	152b	32	60	Shelf #3
	60b	113	107	Book case #3, 5th shelf
	172a	21	52	File cabinet #1, drawer #4
	79a	32	27	Left bottom desk drawer, desk #1
	80a	84	97	Left bottom desk drawer, desk #1
1140	20a	24	< MDA	2nd shelf
	80a	69	71	Desk #2, top of desk
	22b	20	70	Middle desk drawer
1142	132	26	< MDA	Shelf #6, bottom right
	152	102	293	18"x6' steel pipe #1
	153	26	38	18"x6' steel pipe #1
	154	113	231	18"x6' steel pipe #1
	155	47	190	18"x6' steel pipe #1
	156	89	252	18"x6' steel pipe #2
	157	54	150	18"x6' steel pipe #2
	158	137	238	18"x6' steel pipe #2
	159	195	828	18"x6' steel pipe #2

DISPOSITION

All items found contaminated by the 5480.11 survey team are listed in Table I and II. These item(s) have been removed/disposed of/decontaminated by the 5480.11 survey team.

Wing 1 survey took in excess of six months to complete. Several factors account for this excess length of time, one being the lack of decontamination personnel to decontaminate/dispose of contaminated items. Another reason is the tremendous backlog at the HSE-1 Health Physics Analysis Lab (HPAL). The RPM technicians, along with the two HSE-10 technicians, decontaminated approximately 90% of the items found contaminated. A total of 590 smears were lost in transit to HPAL or at HPAL, these smears had to be retaken.

All follow-up surveys have been completed and all the records for wing 1 have been closed out. The survey documentation has been turned over to HSE-10 for archiving.

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