

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.: 030-05596

License No.: 32-12358-01

Report No.: 32-12358-01/97-01

Licensee: U.S. Department of Health & Human Services
National Institute of Environmental Health Sciences

Location: 104 T.W. Alexander Drive (North Campus)
Research Triangle Park, NC

Date: January 13-17, 1997

Inspectors: Jay L. Henson, Radiation Specialist
Bryan A. Parker, Radiation Specialist

Approved by: John P. Potter, Chief
Materials Licensing/Inspection Branch 2
Division of Nuclear Materials Safety

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Enclosure

EXECUTIVE SUMMARY

U.S. Department of Health & Human Services
National Institute of Environmental Health Sciences
NRC Inspection Report No. 32-12358-01/97-01

This routine, announced inspection was conducted to evaluate the current radiological status of the North Campus facilities (Buildings 4, 5, 6, 7, 9A, and 10) formerly utilized by the licensee located at 104 T.W. Alexander Drive, Research Triangle Park, North Carolina. The National Institute of Environmental Health Sciences (NIEHS) was initially authorized to possess byproduct material including hydrogen 3, carbon 14, phosphorus 32, and sulfur 35 for laboratory research studies, including studies in lower animals in 1967. Since that time, NIEHS has been authorized to use any byproduct material with atomic numbers 1 through 83 and has used licensed materials in buildings 2, 3, 4, 5, 6, 7, 9A, 10, 13, 14, 15, and 16 at their North Campus facilities. Buildings 2 and 3 were renovated by the licensee prior to 1991 and are currently used as office space. Buildings 13, 14, 15, and 16 were decommissioned by the licensee in 1993 and released for unrestricted use by a license amendment dated December 17, 1993. NIEHS ceased licensed activities at the North Campus facilities in September, 1996. NIEHS forwarded the results of their final survey of buildings 2, 3, 4, 5, 6, 7, 9A and 10 in a license amendment request dated November 14, 1996. The purpose of this inspection was to obtain confirmatory measurements which could be used to verify the final survey results reported by the licensee. The results of this inspection and any subsequent followup inspections will be used to determine if these buildings can be released for unrestricted use. The conduct of this inspection included discussions with cognizant licensee representatives, reviews of documents, and direct observations and radiological surveys of the site.

Licensee's Final Survey Report

The inspectors reviewed the licensee's final survey report included with the license amendment request dated November 14, 1996. The licensee stated that the final survey procedures were based on guidelines given in NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination. Based upon the results reported, it appeared that the facilities met the criteria for release for unrestricted use. A confirmatory survey was scheduled for the week of January 13-17, 1996.

Disposition of Materials

The inspectors determined that no licensed materials were stored at the North Campus buildings. The licensed materials formerly stored at this facility and the contaminated materials from the decommissioning of this facility were transferred to the NIEHS South Campus facility at 111 Alexander Drive, Research Triangle Park, North Carolina, for subsequent use or disposal.

Confirmatory Surveys

The inspectors obtained direct contamination measurements, removable contamination samples, and dose rate measurements from approximately 2.5 percent of the affected areas surveyed by the licensee. The inspectors did identify areas in buildings 4, 5, and 7 that exceeded the criteria for release of the facilities for unrestricted use. The majority of the areas that exceeded the release criteria were "hot spots" of less than a 100 cm² in laboratory hoods. Those areas which were identified by the inspectors as exceeding the limits during the survey were remediated by the licensee and resurveyed by the inspectors. All areas but one in building 5 were adequately remediated prior to the end of the inspection. This area was subsequently remediated and resurveyed by the licensee and the results forwarded in a report dated January 21, 1997.

Based upon the results of the confirmatory survey, the inspectors concluded that the licensee's final survey of the North Campus facilities was not adequate to demonstrate that the facilities met the criteria for release for unrestricted use. It appeared that the licensee's survey instruments and procedures did not enable the licensee to detect "hot spots" that exceeded the maximum release criteria of 15,000 dpm/100 cm² for surface contamination. The most probable cause for the licensee's failure to detect these "hot spots" was an inadequate scan of each square meter grid. Region II management determined that the licensee needed to perform additional surveys of these facilities or provide additional information that demonstrates these facilities meet the criteria for release for unrestricted use before approving release of buildings 4, 5, 6, 7, 9A, and 10.

LIST OF PERSONS CONTACTED

Licensee

S. Merkle, Chief, Health and Safety
P. Hamrick, Radiation Safety Officer
W. Fitzgerald, Jr., Health Physicist

Others

E. Rooks, Director of Physical Development, Research Triangle Park

REPORT DETAILS

01. Preliminary Review

10 CFR 30.36 (j)(2) requires in part, that as the final step in decommissioning, the licensee conduct a radiation survey of the premises where the licensed activities were carried out and submit a report of the results of this survey to the NRC.

The licensee submitted its final survey of building 2, 3, 4, 5, 6, 7, 9A, and 10 on November 14, 1996. The licensee stated that the final survey procedures were based on guidelines given in NUREG/CR-5849, Manual for Conducting Radiological Surveys in Support of License Termination. The licensee divided each building into affected and unaffected areas and established a 1 meter square grid pattern in each area surveyed. The licensee surveyed each affected area (up to 2 meters on the walls) by obtaining a one minute scaler count from the center of each 1 meter square grid with a portable survey instrument. If this measurement was elevated compared to background, a slow survey of the entire grid was made to determine if there were any contaminated areas. A swipe of approximately 100 cm² was obtained from the center of each grid or other appropriate areas to assess the level of removable contamination in each grid. Based upon their review of the docket file, and the licensee's final survey report, Region II staff determined that a confirmatory survey was necessary prior to release of the North Campus facilities.

02. Conduct of Confirmatory Survey

During the week of January 13-17, 1997, the inspectors obtained confirmatory measurements from a minimum of 2.5 percent of the affected areas surveyed by the licensee and described in its final survey report. The inspectors obtained direct and removable contamination measurements and dose rate measurements from buildings 4, 5, 6, 7, 9A, and 10. Buildings 2 and 3 had been significantly renovated at least 5 years prior to the inspection and the original floor and wall surfaces, as well as furnishings, were either removed or covered by new materials. The licensee treated these buildings as unaffected areas in their final survey and performed the appropriate survey for unaffected areas as described in NUREG/CR-5849. Based upon the renovation of buildings 2 and 3, and the results of the licensee's surveys, the inspectors decided to focus their confirmatory survey on the other North Campus buildings.

The inspectors performed the survey by first selecting the areas to be surveyed in each building. One square meter grids as depicted in the licensee's final survey report dated November 14, 1996, were selected randomly and in some cases based upon either the results reported in the licensee's final survey or because of the probability of a particular area to be contaminated (e.g., hoods, sinks, etc.). One inspector scanned each selected grid with a thin window (100 cm²) gas proportional scaler/ratemeter instrument in the alpha/beta mode. Five points were selected in each grid for a one minute scaler count to determine the average level of surface contamination in the grid. Elevated areas

identified during the scanning of the grid were included as one of the five points. A smear for removable contamination was taken from the point with the highest fixed contamination in each grid. The second inspector randomly scanned the floor, wall surfaces up to two meters in height, and furnishings (e.g., countertops, hoods, sinks, etc.) with a ratemeter and "pancake" probe. Areas of elevated activity were marked for further evaluation with the gas proportional instrument. A dose rate measurement was also obtained at one meter above each grid with a microR meter. Each survey instruments performance was verified before, during and after each day of use with check sources. Information on the instruments used in this survey is at Table 2, Survey and Laboratory Instruments Used for Confirmatory Survey.

03. Results of Confirmatory Survey

The licensee was authorized to use any byproduct material with atomic numbers 1 through 83, in any form in its North Campus facilities. However, based upon a review of the docket file, interviews with licensee staff, and the short half-life of most of the radionuclides used, it appeared the most likely radionuclides that may be present were hydrogen 3 (H-3) and carbon 14 (C-14). There was also some potential for iodine 125 (I-125) to be present in one lab in Building 7. However, no iodinations were performed in this lab and only microcurie amounts of I-125 labeled compounds were used. The release criteria limits that applied for H-3 and C-14 were 5000 dpm/100 cm² average and 15000 dpm/100 cm² maximum for total surface contamination and 1000 dpm/100 cm² for removable contamination. The release criteria limits for I-125 were 100 dpm/100 cm² average and 300 dpm/100 cm² maximum and 20 dpm/100 cm² for removable contamination. The dose rate limit was 5 μ rem/hour at one meter above the surface surveyed.

The results of the confirmatory survey are summarized in Table 1, Confirmatory Survey Results. The inspectors did identify levels of direct surface and removable contamination that exceeded the release criteria for H-3 and C-14 in buildings 4, 5, and 7.

In Building 4, areas of direct surface contamination that exceeded either the average or maximum limits were identified in the hoods in room 405, grids P23 and P24, room 406, grids A17 and B17, and room 414, grids A12 and B12. The licensee remediated these areas and the inspectors resurveyed the hoods and determined that the levels of residual direct surface contamination were below the limits.

In Building 5, areas of direct surface contamination that exceeded either the average or maximum limits were identified in the hoods in room 510, grids A13 and B13, and room 514, grids A12 and B12. The licensee remediated these areas and the inspectors resurveyed the hoods and determined that the levels of residual direct surface contamination were below the limits in the hood in room 510, but levels of contamination exceeding the limits remained in the hood in room 514. The licensee has subsequently decontaminated the hood in room 514 and provided the results of their remediation and resurvey efforts in a

letter dated January 21, 1997. Based upon the results of the survey reported in that letter (all areas remediated to less than 5000 dpm/100 cm²), it appears that the hood in room 514 meets the release criteria.

In building 7, areas of direct surface contamination that exceeded either the average or maximum limits were identified in the hood in room 755, grid 035 and 036 and on the floor around this hood. The licensee remediated the hood by cleaning the contaminated areas. The licensee remediated the floor by removing the contaminated floor tiles. The inspectors resurveyed the hood and the floor that was beneath the tiles and determined that the levels of residual direct surface contamination were below the limits. The inspectors identified an area that exceeded the removable surface contamination limits on a countertop in room 755 in grid L35. The licensee remediated this area by removing the laminate surface from the countertop in the contaminated area. The inspectors resurveyed the countertop and identified an area of direct surface measurement that was elevated, but was below the limits. In its January 21, 1997, letter, the licensee reported that it had also removed this area from the countertop.

The laboratory marked as rooms 713 and 715 in building 7 was the only location where I-125 was reportedly used. The inspectors did not have survey instrumentation capable of detecting levels of contamination below the direct surface limits of 100 average and 300 maximum dpm/100 cm². Removable contamination smears were obtained from the grids surveyed in this laboratory and analyzed in a liquid scintillation counter for the presence of I-125. The levels of removable contamination measured from these smears was below or slightly above the minimum detectable activity of the liquid scintillation counter. The inspectors concluded that the probability of I-125 contamination exceeding the release criteria being present in this laboratory was extremely low due to the low activity of the materials used (microcurie amounts of labeled compounds), the short half life of I-125 (60 days), and the results of the licensee's survey.

Based upon the results of the confirmatory survey, the inspectors concluded that the licensee's final survey of the North Campus facilities was not adequate to demonstrate that the facilities met the criteria for release for unrestricted use. It appeared that the licensee's survey instruments and procedures did not enable the licensee to detect "hot spots" that exceeded the maximum release criteria of 15,000 dpm/100 cm² for surface contamination. The most probable cause for the licensee's failure to detect these "hot spots" was an inadequate scan of each square meter grid. The inspectors briefed Region II management on the results of the confirmatory survey and determined that the licensee needed to perform additional surveys of these facilities or provide additional information that demonstrates these facilities meet the criteria for release for unrestricted use before approving release of buildings 4, 5, 6, 7, 9A, and 10.

EXIT MEETING SUMMARY

The inspectors discussed the inspection results with Mr. Merkle and his staff on January 17, 1996. The inspectors informed Mr. Merkle that several areas of contamination exceeding the current release criteria were discovered in the facilities at the North Campus and that additional surveys may be required to demonstrate that these facilities meet the release criteria. The inspectors also informed the licensee that the results of this confirmatory survey would be reviewed by Region II management and a decision rendered as to the suitability of the North Campus facilities for release for unrestricted use.

INSPECTION PROCEDURES USED

IP 83890: Closeout Inspection and Survey

TABLE 1

CONFIRMATORY SURVEY RESULTS

National Institute of Environmental Health Sciences
Confirmatory Survey

Survey Dates: January 14-17, 1997

License No.: 32-12358-01 Docket No.: 030-05596

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
6;620;A15 Countertop	<MDA	<MDA	B	<MDA	<MDA	<MDA	0
6;620;A15 Wall	<MDA	911	N1	<MDA	<MDA	<MDA	3
6;620;C13 Floor	<MDA	<MDA	N2	<MDA	<MDA	<MDA	3
6;601;BB27 Floor	<MDA	<MDA	N3	6.9	<MDA	<MDA	0
6;601;X24 Wall	<MDA	<MDA	N4	9.8	<MDA	<MDA	0
6;601;CC13 Countertop	<MDA	<MDA	N5	11	<MDA	<MDA	2
6;601;AA12 Floor	<MDA	<MDA	N6	<MDA	<MDA	<MDA	1
6;613;X9 Hood	<MDA	<MDA	N7	10	<MDA	<MDA	1

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg:Room:Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μ rem/hour above background
6:613:T12 Floor	<MDA	<MDA	N8	11.7	<MDA	<MDA	0
6:613:T12 Sink	<MDA	<MDA	N9	10.7	<MDA	<MDA	0
6:Hall:R12 Floor	<MDA	<MDA	N10	10.4	<MDA	<MDA	0
6:Hall:R21 Floor	<MDA	<MDA	N11	12.3	<MDA	<MDA	0
6:614:N13 Wall	<MDA	<MDA	N12	11.4	<MDA	<MDA	0
6:617:Z6 Floor	<MDA	<MDA	N13	11	<MDA	<MDA	1
6:606:M20 Countertop	<MDA	<MDA	N14	10.4	<MDA	<MDA	0
9A:NA:C8 Floor	<MDA	<MDA	N15	19.7	<MDA	<MDA	0
9A:NA:B4 Floor	<MDA	<MDA	N16	19.7	<MDA	<MDA	0
9A:NA:D3 Floor	<MDA	<MDA	N17	14.9	<MDA	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
7;726;U9 Countertop	<MDA	<MDA	N18	11.4	9.2	<MDA	2
7;726A;X11 Floor	<MDA	<MDA	N19	10.4	<MDA	<MDA	2
7;Hall;AA8 Floor	<MDA	<MDA	N20	12	<MDA	<MDA	2
7;719;HH4 CT/Sink	<MDA	<MDA	N21	14.3	23.7	<MDA	0
7;723;FF5 Floor	<MDA	<MDA	N22	13.6	7.0	<MDA	0
7;Hall;AA19 Floor	<MDA	<MDA	N23	13	<MDA	<MDA	2
7;723;CC2.3 Hood Hot Spot 1	-	1962	N24	14.9	46.3	7.12	0
7;723;CC2.3 Hood General Area	1118	2468	N25 See N59	15	200	<MDA	0
7;723;CC2.3 Hood Hot Spot 2	-	2278	N26	10	115.3	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
7;717;GG17 Countertop	<MDA	<MDA	N27	13	39	<MDA	0
7;717;II16 Floor	<MDA	<MDA	N28	12.7	79	<MDA	2
7;717A;HH21 Floor	<MDA	<MDA	N29	13	25.3	<MDA	0
7;716;T17 Floor	<MDA	<MDA	N30	15.9	<MDA	<MDA	0
7;716;W20 Wall	<MDA	<MDA	N31	13	<MDA	<MDA	0
7;715;EE19 Countertop	<MDA	<MDA	N32	13	34.3	<MDA	0
7;713;EE24 Floor	<MDA	<MDA	N33	13	<MDA	<MDA	0
7;703;S32 Floor	<MDA	<MDA	N34	14.3	<MDA	<MDA	1
7;703;R35 Countertop	<MDA	<MDA	N35	14.3	<MDA	<MDA	0
7;Hall;P32 Floor	<MDA	<MDA	N36	12	<MDA	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
7;755;035 Hood, Horizontal surface (See N43)	<MDA	<MDA	N37	<MDA	<MDA	<MDA	0
7;755;L35 Countertop (contaminated area removed by licensee)	1188	5330	N38	<MDA	3029	1255	0
7;755;J36 Floor	<MDA	<MDA	N39	<MDA	<MDA	9.79	0
7;755;F37 Countertop	<MDA	<MDA	N40	<MDA	<MDA	<MDA	2
7;747;E30 Floor	<MDA	<MDA	N41	<MDA	<MDA	<MDA	1
7;747;A25 Countertop	<MDA	<MDA	N42	<MDA	<MDA	<MDA	2
7;755;035 Hood Sill Hot Spot 1	-	259582	N43	51	12.6	23.91	0
7;755;035 Hood Sill HS1 Resurvey	-	6886	-	-	-	-	-

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate µrem/hour above background
7;755;035 Hood Sill Hot Spot 2	-	9848	N44	13.6	<MDA	6.83	0
7;755;035 Hood Sill HS2 Resurvey	-	443	-	-	-	-	-
7;755;035 Hood Sill Hot Spot 3	-	2430	-	-	-	-	-
7;755;035 Floor by hood Hot Spot 4 (Tile removed)	-	7620	-	-	-	-	-
7;755;035 Floor by hood Hot Spot 5 (Tile removed)	-	133202	N45	53.3	36	260	-
7;745;C23 Countertop	<MDA	<MDA	N46	12.3	24.3	<MDA	0
7;745;E25 Wall	<MDA	<MDA	N47	12.7	<MDA	<MDA	0
7;Hall;K13 Floor	<MDA	<MDA	N48	13	<MDA	<MDA	3

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
7;739;E15 Floor	<MDA	<MDA	N49	12.7	<MDA	<MDA	0
7;739;A11 Countertop	<MDA	<MDA	N50	12.3	<MDA	<MDA	2
7;742;018 Floor	<MDA	<MDA	N51	12.3	<MDA	<MDA	0
7;742;P21 Floor	<MDA	<MDA	N52	13	<MDA	<MDA	0
7;732;N13 Floor	<MDA	<MDA	N53	14.6	<MDA	<MDA	0
7;732;Q10 Countertop	<MDA	<MDA	N54	12.3	<MDA	<MDA	1
7;733;N6 Floor	<MDA	<MDA	N55	10.7	<MDA	<MDA	0
7;733;01 Countertop	<MDA	<MDA	N56	15.5	57.7	<MDA	1
7;731;Q2 Floor	<MDA	<MDA	N57	12.7	13.7	<MDA	0
7;731;P2 Hood	<MDA	<MDA	N58	12	281.5	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate µrem/hour above background
7;723;CC2,3 Hood Sill Hot Spot 1 (Resurvey)	-	<MDA	N59	13.6	16.1	<MDA	0
5;501;A23,24 Hood	3112	13165	N60	13.3	<MDA	<MDA	2
5;Hall;H16 Floor	<MDA	<MDA	N61	13.6	<MDA	<MDA	0
5;506;E17 Countertop	<MDA	<MDA	N62	13.6	<MDA	<MDA	0
5;506;B18 Floor	<MDA	<MDA	N63	11.7	<MDA	<MDA	1
5;510;G16 CT/Sink	<MDA	<MDA	N64	17.1	<MDA	<MDA	0
5;511;J13 Countertop	<MDA	<MDA	N65	16.2	<MDA	<MDA	0
5;511;O,N13 Hood	<MDA	<MDA	N66	12	<MDA	<MDA	0
5;514;E9 Floor	<MDA	1886	N67	15.2	<MDA	<MDA	0
5;514;D7 Countertop	<MDA	<MDA	N68	14.9	<MDA	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
5;Hall;I4 Floor	<MDA	<MDA	N69	15.2	<MDA	<MDA	0
5;518;E2 Floor	<MDA	<MDA	N70	16.8	<MDA	<MDA	2
5;518;A1 CT/Sink	<MDA	<MDA	N71	13.9	<MDA	<MDA	4
5;518;A5 Floor	1048	3557	N72	14.3	<MDA	<MDA	3
5;510;A,B13 Hood Sill Hot Spot 1	-	31342	N73	14.3	<MDA	<MDA	-
5;510;A,B13 Hood Sill HS1 Resurvey	-	430	-	-	-	-	-
5;510;A,B13 Hood Sill Hot Spot 2	-	14012	See N73	-	-	-	-
5;510;A,B13 Hood Sill HS2 Resurvey	-	747	-	-	-	-	-

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
5;514;A,B12 Hood Hot Spot 1	-	30240	N74	26.4	<MDA	10.51	0
5;514;A,B12 Hood HS1 Resurvey	-	10481	-	-	-	-	-
5;514;A,B12 Hood Hot Spot 2	-	17683	-	-	-	-	-
5;514;A,B12 Hood HS2 Resurvey	-	21354	-	-	-	-	-
5;514;A,B12 Hood Hot Spot 3	-	12127	-	-	-	-	-
5;514;A,B12 Hood HS3 Resurvey	-	10569	-	-	-	-	-
5;514;A,B12 Hood Hot Spot 4	-	17456	N75	14.3	<MDA	6.46	-

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
5;514;A,B12 Hood HS4 Resurvey	-	<MDA	-	-	-	-	-
5;514;A,B12 Hood, Back Wall Hot Spot 6	-	17038	-	-	-	-	-
4;401;C24 Floor	<MDA	<MDA	N76	<MDA	<MDA	<MDA	0
4;405;M25 Countertop	<MDA	<MDA	N77	10.1	<MDA	<MDA	0
4;405;P23,24 Hood	11870	29430	N78	15.9	<MDA	12.43	2
4;405;P23,24 Hood Resurvey	2944	6228	-	-	-	-	--
4;Hall;H20 Floor	<MDA	<MDA	N79	11.1	<MDA	<MDA	0
4;406;A,B17 Hood	25170	101038	N80	32	48.7	26.1	0
4;406;A,B17 Hood Resurvey	2808	4443	-	-	-	-	-
4;414;F7 Wall	<MDA	<MDA	N81	17.5	<MDA	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg;Room;Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate μrem/hour above background
4;414;C7 Countertop	2314	6760	N82	14.6	48.1	26.1	0
4;414;A,B12 Hood	6640	21417	N83	96	122.9	123.9	2
4;414;A,B12 Hood Resurvey	4215	11481	-	-	-	-	-
4;418;AB6 Hood	<MDA	<MDA	N84	11.7	<MDA	<MDA	0
4;419;K3 Floor	<MDA	<MDA	N85	16.8	<MDA	<MDA	0
4;419;M4 Countertop	<MDA	<MDA	N86	11.4	<MDA	<MDA	0
4;419;P6 Countertop	<MDA	<MDA	N87	12	<MDA	<MDA	2
4;414;A,B12 Hood Sill	9784	15734	N88	16.8	<MDA	9.18	0
4;414;A,B12 Hood Sill Resurvey	4705	9772	-	-	-	-	-
10;1014B;A1.2 Hood	<MDA	<MDA	N89	22.3	<MDA	<MDA	0

Confirmatory Survey Results, NIEHS, 32-12358-01

Sample Location Bldg:Room:Grid Surface	Direct Measurement Average dpm/100 cm ²	Direct Measurement Maximum dpm/100 cm ²	Smear No.	Gross Beta dpm/100 cm ²	H-3 dpm/100 cm ²	C-14 dpm/100 cm ²	Dose Rate µrem/hour above background
10;1014B:E2 Floor	<MDA	<MDA	N90	11.7	<MDA	<MDA	0
10;1014B:J6 Floor	<MDA	<MDA	N91	14.6	<MDA	<MDA	0
10;1014A:D9 Floor	<MDA	<MDA	N92	11.1	<MDA	<MDA	0
10;1014A:A11.12 CT/Sink	<MDA	<MDA	N93	13.6	<MDA	<MDA	0
10;1014A:I13 Floor	<MDA	<MDA	N94	14.3	<MDA	<MDA	0
10;Hall:I37 Floor	<MDA	<MDA	N95	13.6	<MDA	<MDA	0
10;1008:B35 Floor	<MDA	<MDA	N96	14.3	<MDA	<MDA	0
10;1006:D42 Floor	<MDA	<MDA	N97	13.6	<MDA	<MDA	0
10;1006:A39 Wall	<MDA	<MDA	N98	12	<MDA	<MDA	0

TABLE 2

SURVEY AND LABORATORY INSTRUMENTS USED FOR CONFIRMATORY SURVEY

National Institute of Environmental Health Sciences
Confirmatory Survey

Survey Dates: January 14-17, 1997

License No.: 32-12358-01 Docket No.: 030-05596

Manufacturer	Instrument 1) Model 2) S/N	Probe/Detector 1) Model 2) S/N 3) Area (cm ²)	Calibrated	Background	Efficiency	MDA dpm/100 cm ²
Ludlum	1) 2221 2) 117632	1) 43-68 2) 120554 3) 100	3/29/96	138 cpm	0.079 (C-14)	Scaler: 725 Scan: 5240
Eberline	1) ESP2 2) 00782	1) HP 260 2) N/A 3) 15	2/13/96	37 cpm	0.044 (C-14)	Scaler: 4696 Scan: 16818
Ludlum	1) 19 2) 33546	Internal NaI	2/13/96	8 μ rem/hr	N/A	N/A
Gamma Products	1) G5000 Smear Counter	1) Internal Gas proportional (gross beta)	1/22/97 (checked before use)	1.4 cpm	0.312 (Tc-99)	6.5
United Technologies	1) Packard 2000 CA/LL	1) Liquid Scintillation (H-3, C-14, I-125)	1/23/97 (checked before use)	4.5 cpm 16.3 cpm	0.929 (H-3) 1.0 (C-14)	3.7 6.2