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June 25, 2009

Dennis R. Lawyer
Health Physicist
Commercial and R&D Branch
Division of Nuclear Materials Safety
U.S. Nuclear Regulatory Commission, Region I
475 Allendale Road
King of Prussia, PA 19406-1415

James P. Rust
Director, Facilities

Sarnoff Corporation
201 Washington Road
Princeton, NJ 08540
Tel. 609-734-3008
Fax. 609-720-4940
jrust@sarnoff.com

SUBJECT: THE SARNOFF CORPORATION, REQUEST FOR ADDITIONAL
INFORMATION CONCERNING APPLICATION FOR AMENDMENT TO
LICENSE, CONTROL NO. 143652

NRC License Number: 29-28005-01

J-6
MS-16
03029879

Dear Mr. Lawyer:

This is in response to your letter of 27 April 2009 requesting additional information related to our recent radioactive material license amendment request. Numbers items below correspond to the numbered requests in your letter.

1. You have requested surveys of the areas in which hydrogen-3, carbon-14, and calcium-45 were used. We have never used carbon-14 or calcium-45. However, we have used hydrogen-3 (tritium).

Hydrogen-3 was used for bench top laboratory studies in room EN-307. Hydrogen-3 was used to a much lesser extent in rooms EN-302 and EN-310 where sealed liquid scintillation vials were brought for analysis on a liquid scintillation counter. In addition, the Pond Building (a one-room building) had been used for storage of containers of radioactive waste, including hydrogen-3.

Attached are final contamination surveys for rooms EN-307, EN-302, EN-310, and Pond Building that were conducted after all hydrogen-3 was removed from the room and no hydrogen-3 was brought back to the room.

2. Per your direction, we request a partial building release of the rooms in which we had used hydrogen-3 and no longer need to use those rooms for other unsealed isotopes. As such we list the following rooms as requested.

A. Rooms where we no longer need to store or use licensed material:

EN-116 (only used for nuclides with half lives less than 120 days)
EN-302
EN-307
EN-308 (never used for unsealed materials)
EN-309 (never used for unsealed materials)
EN-314 (never used for unsealed materials)
EN-317 (only used for nuclides with half lives less than 120 days)

E-324 (never used for unsealed materials)
E-326 (never used for unsealed materials)
E-331 (never used for unsealed materials)

 **SARNOFF**
Corporation

143652
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SW-220 (never used for unsealed materials)

W-225, W-227, W-229, W-231, W-233 (Clean room facility. Used for sealed sources only. Never used for unsealed materials.)

W-402B (former radioactive waste storage)

Pond Building (former radioactive waste storage)

- B. Rooms in which we used hydrogen-3 and where we no longer need to store or use licensed material.

EN-307

EN-302

Pond Building

- C. Rooms in which we used hydrogen-3, and will still need to use licensed material.

[REDACTED]

In summary, if the above described partial building release is approved by the NRC, and our license amendment is granted, the following remaining rooms would continue to be approved for licenses materials:

[REDACTED]

In addition, we request the following rooms be added to our license for use with sealed sources only:

[REDACTED]

3. In support of an environmental assessment related to the release a portion our facility, we provide the following information as requested:

A. The name of the facility is The Sarnoff Corporation.

B. The size of the complex (in Acres) is 254.
The size of the building in square feet is 600,000.
The area to be released in square feet is 1,413.
The total area in square feet in which hydrogen-3, carbon-14, or calcium-45 was stored or used is 1,413.

C. The type of building use is general office and research and development laboratory.

D. The surrounding area is described as residential.

The general type of activities authorized on the license are laboratory procedures typically performed on bench tops.

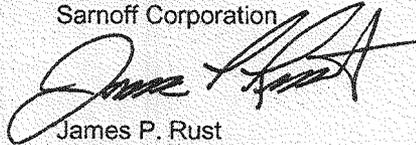
4. We have records as follows:

- A. For unsealed materials with half-lives greater than 120 days, records for disposal made pursuant to 10 CFR 20.2002 (alternate disposal procedures, including burial authorized prior to January 28, 1981) [no alternate disposals have been done], 20.2003 (disposals to the sanitary sewerage system) [no disposals to the sanitary sewer system have been done], 20.2004 (incineration of wastes) [no incineration of wastes have been done], 20.2005 (disposal of specific wastes including liquid scintillation cocktail and animal tissue), and 20.2103(b)(4), evaluations of effluent releases.
- B. Records important for decommissioning as described in 30.35(g), 40.36(f) and 70.25(g). Examples of such records include but are not limited to: records of contamination, identifying the radionuclides, quantities and concentrations; asbuilt drawings and modifications of structures and equipment in restricted areas and locations of inaccessible contamination such as buried pipes; a single list, updated at least every 2 years, of areas to which access is limited for the purpose of radiation protection (restricted areas); and records related to the provision of financial assurance.

5. For areas that are partially released, we will take steps to prevent recontamination and not use this area for licensed material in the future.

Feel free to contact me at 609-734-3008 if you have any questions.

Very truly yours,
Sarnoff Corporation



James P. Rust
Director, Facilities

cc: Wesley R. Van Pelt, PhD, CIH, CHP, Radiation Safety Officer

Attachments:

Survey of Room EN-307
Survey of Room [REDACTED]
Survey of Room EN-302
Survey of Pond Building

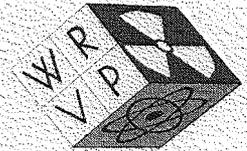
Survey of Room EN-307

WESLEY R. VAN PELT ASSOCIATES, INCORPORATED

WESLEY R. VAN PELT, PH.D.
President
CERTIFIED HEALTH PHYSICIST
CERTIFIED INDUSTRIAL HYGIENIST
Consulting in Environmental & Radiological Health & Safety

773 PARAMUS ROAD
PARAMUS, NEW JERSEY 07652
TEL: 201-445-5124
FAX: 201-445-6488
E-MAIL: VANPELTW@IDT.NET

24 July 1998



Dr. James Matey
Radiation Safety Officer
Sarnoff Corporation
201 Washington Rd.
Princeton, NJ 08543-5300
609-734-2868

Subject: Final Radiation Survey of Room EN-307

Dear Jim,

On 15 July 1998 I did a final radiation contamination survey of room EN-307. This room had been used by Dr. Paul Mitsis of seQ Ltd until about two weeks prior to the survey. He used only H-3 and P-32. No other radionuclides were used in this room. At the time of the survey, all of seQ's equipment, supplies, radioactive reagents, radioactive waste, etc. had been removed from the room. No normal cleaning had been done yet.

Survey Meter Survey for P-32

I did a radiation survey meter scan of all surfaces in the lab, including floors, benches, shelves, drawers (inside and outside), cabinets (inside and outside), door, lab hood (including inside, outside and sink), sink and walls. The scan involved slowly moving the probe about 1 cm above the surface. The survey meter is a Ludlum Model 16 Ratemeter, Serial No. 54796, with Model 44-9 pancake style Geiger probe, Serial No. PR044692, calibrated 9 September 1997. The background reading was 20 to 40 counts per minute (cpm). For the Model 44-9 pancake GM probe, Ludlum Measurements Inc., gives the 4π geometry counting efficiency for P-32 as 32%.

Recent US multi-agency radiation survey procedures¹ give the Minimum Detectable Count Rate (MDCR) of 50 net cpm for a 45 cpm background. That is, one can detect 50 cpm

¹Multi-Agency Radiation Survey and Site Investigational Manual (MARSSIM), NUREG-1575, EPA 402-R-97-016, final, December 1997.

above a background of 45 cpm when scanning a surface. The MARSSIM gives the Minimum Detectable Concentration (in dpm/100 cm²) when scanning a surface as

$$\text{Scan MDC} = \frac{\text{MDCR}}{\sqrt{p} e_i e_s \frac{\text{probe area}}{100 \text{ cm}^2}}$$

where,

Scan MDC = Minimum Detectable surface Concentration, dpm/100 cm²

p = surveyor efficiency = 0.5

e_i = instrument efficiency = 0.32

e_s = surface efficiency = 0.70

probe area = active area of detector probe = 15 cm²

The Scan MDC = 2100 dpm/100 cm².

No area showed any surface contamination above the background reading of the survey meter. Therefore, all surveyed surfaces are reported as less than 2100 dpm/100 cm².

Swipe Survey for Removable H-3 and P-32

I also did a survey for removable contamination by wiping surfaces with cotton swabs and analyzing them for H-3 and P-32 with Sarnoff's Beckman LS6500 liquid scintillation counter (lsc). Each wipe covered 200 cm² or more. The lsc internal protocol reports activity in dpm units (i.e., corrected for background and efficiency) using its Auto-DPM method, and gross cpm in the P-32 channel. None of the samples showed any counts above background in the P-32 channel. The output of the lsc is attached. The highest Auto-DPM value reported was for sample number 10 (the sink in the hood) which was 35 dpm of H-3. Since all swipes were at least 200 cm², swipe number 10 is therefore reported as 17.5 dpm/100 cm².

Evaluation of Results

Evaluation of the results of the survey is best done by comparing the detected contamination levels with the levels allowed for release for unrestricted use by an NRC guidance document.¹ This NRC document indicates that facilities and equipment may be released for unrestricted use if the removable H-3 and P-32 contamination is below 1,000 dpm/100 cm². Thus, even the highest measured swipe value of 17.5 dpm/100 cm² for removable contamination is well below the acceptable release limit of 1,000 dpm/100 cm².

The acceptable levels for unrestricted release for surface contamination (fixed plus removable) is 5,000 dpm/100 cm² as an average and 15,000 dpm/100 cm² maximum. It is clear that since all areas are below 2100 dpm/100 cm², the room is acceptable for unrestricted use.

In conclusion, it is my opinion that room EN-307 and its associated closet may be released for unrestricted use. You should keep this survey report in your permanent files.

Very truly yours,
WESLEY R. VAN PELT ASSOCIATES, Inc.

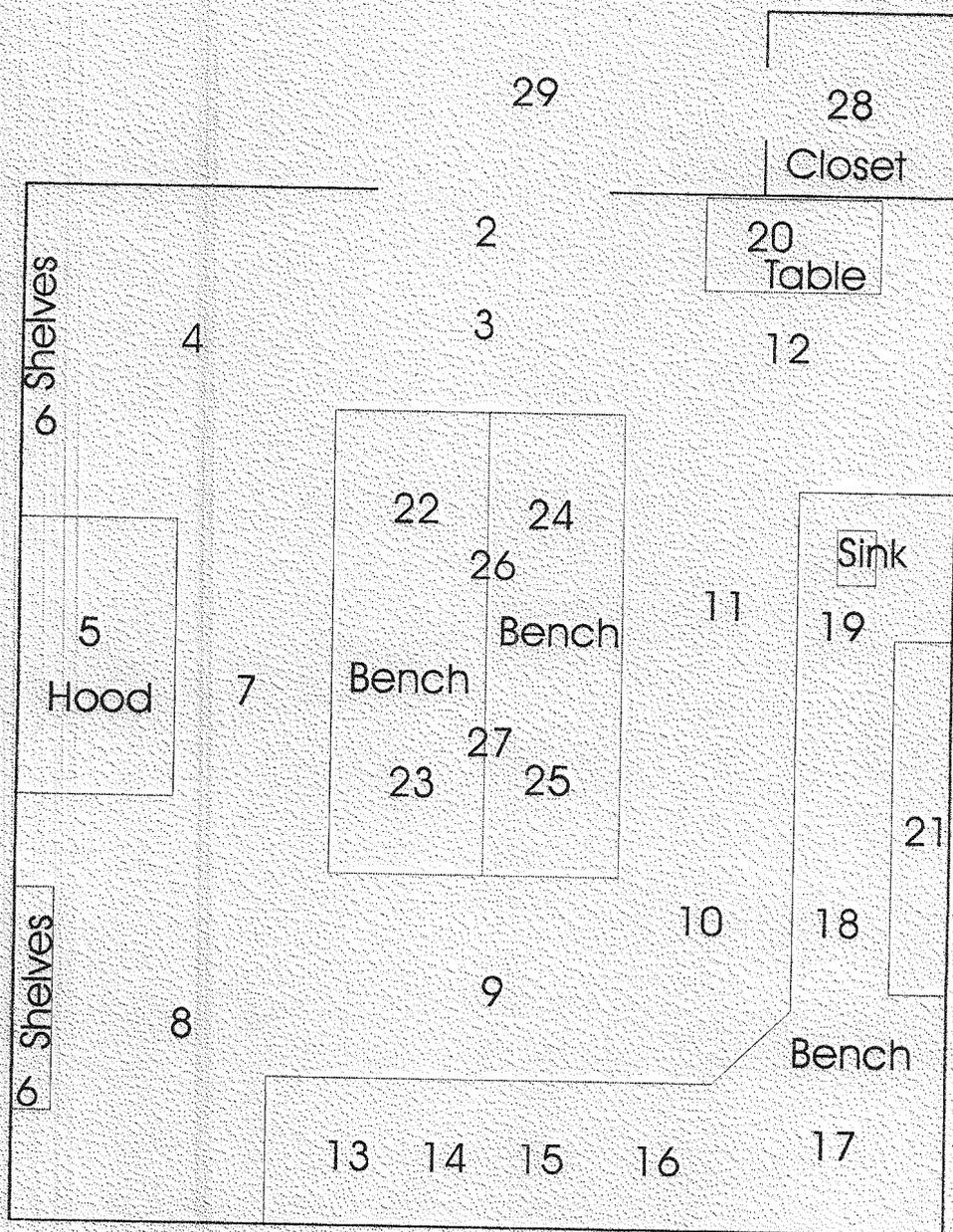
Wesley R. Van Pelt, Ph.D.
President

attachments:

- Floor plan, Room EN-307
- Swipe Locations
- Ludlum specification sheet for Model 44-9 GM probe
- Isc printout

¹"Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," US Nuclear Regulatory Commission, May 1987.

Floor Plan, Room EN-307



Swipe Locations

Swipe No.	Location No. (see floor plan)	Description
1	na	blank (clean cotton swab)
2	2	door, outside
3	2	door, inside
4	3	floor
5	4	floor
6	4	shelves
7	5	hood, outside
8	5	hood, bench, right
9	5	hood, bench, left
10	5	hood, sink
11	5	hood, rear plenum, lower
12	5	hood, cabinets, outside
13	5	hood, cabinets, inside
14	6	shelves
15	7	floor
16	8	floor
17	9	floor
18	10	floor
19	11	floor
20	12	floor
21	13	drawers, outside
22	13	drawers, inside
23	14	drawers, outside

Swipe No.	Location No. (see floor plan)	Description
24	14	drawers, inside
25	15	drawers, outside
26	15	drawers, inside
27	16	drawers, outside
28	16	drawers, inside
29	17	cabinet, outside
30	17	cabinet, inside
31	18	drawers, outside
32	18	drawers, inside
33	19	cabinets under sink, outside
34	19	cabinets under sink, inside
35	13-16	bench top
36	17-19	bench top
37	19	sink
38	20	table
39	21	cabinets on wall, outside
40	21	cabinets on wall, inside
41	22	bench top
42	23	bench top
43	24	bench top
44	25	bench top
45	26	shelves over bench
46	27	shelves over bench
47	26	shelves under bench

Swipe No.	Location No. (see floor plan)	Description
48	27	shelves under bench
49	28	closet, floor
50	28	closet, walls
51	28	closet, mop
52	28	closet, black metal waste cans, outside
53	28	closet, plastic and styrofoam containers
54	29	floor outside of closet

MODEL 44-9 PANCAKE GEIGER-MULLER DETECTOR

PART NUMBER:47-1539



INDICATED USE: Alpha beta gamma survey; Frisking

DETECTOR: Pancake type halogen quenched G-M

WINDOW: 1.7 plus or minus 0.3 mg/cm squared mica

WINDOW AREA:

Active - 15 cm squared

Open - 12 cm squared

EFFICIENCY(4pi geometry): Typically 5%-C-14; 22%-Sr-90/Y-90;
19%-Tc-99; 32%-P-32; 15%-Pu-239

SENSITIVITY: Typically 3300 cpm/mR/hr (*Cs-137 gamma*)

ENERGY RESPONSE: Energy dependant

DEAD TIME: Typically 80 microseconds

COMPATIBLE INSTRUMENTS: General purpose survey meters, ratemeters, and scalers

OPERATING VOLTAGE: 900 volts

CONNECTOR: Series "C" (*others available*)

CONSTRUCTION: Aluminum housing with beige polyurethane enamel paint

TEMPERATURE RANGE: 5 degrees F(-15 degrees C) to 122 degrees F(50 degrees C)

May be certified to operate from -40 degrees F(-40 degrees C) to 150 degrees F(65 degrees C)

SIZE: 1.8" (4.6 cm)H X 2.7" (6.9 cm)W X 10.7" (27.2 cm)L

WEIGHT: 1 lb (0.5kg)

Source: <http://ludlums.com/product/dets/m44-9.htm>

201-45-6403

Wes - Has a LSC OUTPUT
 - And Has Made Other Adjustments For Devs.

J. M. [Signature]

ID: AUTO DPM 5MIN 16 JUL 1998 15:17
 USER: 4 COMMENT: WES
 PRESET TIME: 5.00
 DATA CALC: AUTO DPM HH: YES SAMPLE REPEATS: 1 PRINTER: STD
 COUNT BLANK: YES IC#: NO REPLICATES: 1 RS232: OFF
 TWO PHASE: NO AQC: YES CYCLE REPEATS: 1 DISK: OFF
 SCINTILLATOR: LIQUID LUMEX: YES LOW SAMPLE REJ: 0 RWM LIST: OFF
 LOW LEVEL: NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 3H ZERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 ISOTOPE 2: 32P ZERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	HH	3H		32P		3H DPM	3H EFF-1	LUMEX %	ELAPSED TIME	
			#	CPM	ZERROR	CPM	ZERROR					
B1	**1	5.00	80.0	1	8.20	37.80	22.00	19.07	34.29	23.91	10.77	5.59
Blank Average DPM for 3H: 34.29 COEF. OF VAR: 0.000												
1	**3	5.00	98.6	2	9.20	39.87	20.40	19.80	8.60	21.45	20.12	11.41
2	**4	5.00	89.0	3	10.00	34.42	18.60	20.74	7.45	23.96	14.68	17.19
3	**5	5.00	101.1	4	10.20	36.39	19.40	20.31	13.38	21.40	18.85	22.99
4	**6	5.00	102.4	5	13.20	32.23	19.00	20.52	24.14	22.59	21.48	28.78
5	**7	5.00	91.4	6	9.60	36.82	17.20	21.57	-2.91	30.21	18.19	34.58
6	**8	5.00	100.8	7	9.00	40.52	19.00	20.52	7.94	21.31	20.85	40.38
7	**9	5.00	90.0	8	9.40	35.36	21.00	19.52	10.98	20.76	12.86	46.19
8	**10	5.00	95.7	9	11.80	30.14	21.00	19.52	20.33	21.60	11.07	51.95
9	**11	5.00	91.0	10	22.60	21.32	18.00	21.08	34.68	32.76	14.23	57.79
10	**12	5.00	105.9	11	7.80	51.59	17.20	21.57	1.37	21.87	30.99	63.62
11	**13	5.00	95.6	12	8.60	40.03	16.40	22.09	1.69	23.90	19.07	69.45
12	**14	5.00	141.8	13	10.80	46.33	17.80	21.20	18.59	20.42	39.90	75.33
13	**15	5.00	90.9	14	9.80	35.60	18.60	20.74	14.36	20.14	15.61	81.16
14	**16	5.00	107.5	15	6.80	54.60	22.80	18.73	*****	0.00	24.12	86.99
COUNT RATE TOO LOW OR TOO COMPRESSED												
15	**17	5.00	113.2	16	5.80	57.75	17.80	21.20	1.06	16.41	24.51	92.81
16	**18	5.00	106.5	17	10.80	39.05	19.80	20.10	12.43	23.11	26.39	98.68
17	**1	5.00	96.6	18	11.40	35.11	17.00	21.69	12.37	24.43	23.09	104.60
18	**2	5.00	107.9	19	7.40	45.90	17.00	21.69	-0.92	22.17	21.23	110.42
19	**3	5.00	122.6	20	8.20	52.83	19.00	20.52	0.29	23.71	33.86	116.29
20	**4	5.00	88.8	21	10.20	33.97	21.20	19.43	9.55	23.27	13.92	122.07
21	**5	5.00	95.4	22	7.40	42.92	22.20	18.98	1.99	20.40	13.74	127.84
22	**6	5.00	82.0	23	8.80	36.37	21.60	19.25	4.23	22.84	11.87	133.65
23	**7	5.00	93.1	24	6.20	51.65	21.00	19.52	1.43	17.36	18.85	139.48
24	**8	5.00	84.1	25	9.00	38.77	18.40	20.85	6.83	21.89	18.12	145.30
25	**9	5.00	93.6	26	8.60	40.57	20.60	19.71	3.88	22.53	17.39	151.10
26	**10	5.00	93.9	27	7.40	43.60	16.00	22.36	-4.67	24.98	18.65	156.91
27	**11	5.00	93.3	28	7.00	52.11	17.80	21.20	3.56	18.50	26.20	162.72
28	**12	5.00	85.8	29	9.00	34.72	16.20	22.22	1.49	25.15	12.33	168.50
29	**13	5.00	92.8	30	8.00	45.86	19.00	20.52	6.65	19.54	23.34	174.35
30	**14	5.00	92.9	31	11.20	30.73	18.40	20.85	7.28	26.94	12.23	180.15
31	**15	5.00	94.5	32	5.60	52.03	18.40	20.85	-8.09	21.37	16.68	185.94
32	**16	5.00	88.5	33	9.80	39.39	21.00	19.52	11.09	21.59	21.75	191.77
33	**17	5.00	110.2	34	6.40	48.03	16.20	22.22	-1.52	19.53	19.05	197.37
34	**18	5.00	94.6	35	10.20	33.97	21.00	19.52	12.31	21.89	12.87	203.40
35	**1	5.00	87.7	36	11.00	32.04	21.40	19.77	6.83	21.78	14.00	209.70

37	**4	5.00	92.7	39	6.40	46.57	18.60	21.95	-7.60	23.98	16.87	226.77
40	**5	5.00	89.2	40	10.40	35.27	22.60	18.81	16.27	20.57	16.22	232.57
41	**6	5.00	99.7	41	7.40	50.75	18.20	20.97	-3.16	23.77	27.95	238.39
	7	5.00	93.9	42	5.80	50.23	18.20	20.97	***	0.00	16.33	244.17

SAM NO	POS	TIME MIN	HH	3H		32P		3H DPM	3H EFF-1	LUMEX %	ELAPSED TIME	
				CPM	%ERROR	CPM	%ERROR					
COUNT RATE TOO LOW OR TOO COMPRESSED												
42	**8	5.00	92.0	43	9.20	37.16	14.60	23.41	6.08	22.79	16.65	249.98
43	**9	5.00	92.7	44	8.00	43.04	18.40	20.85	-1.22	24.19	20.90	255.79
44	**10	5.00	110.7	45	11.80	31.99	16.20	22.22	15.79	23.56	16.31	261.61
45	**11	5.00	114.2	46	6.80	45.97	15.60	22.45	-8.49	26.36	18.09	267.41
46	**12	5.00	195.2	47	7.00	69.88	21.20	19.43	18.40	13.28	41.71	273.29
47	**13	5.00	105.7	48	8.40	50.00	19.40	20.31	4.12	21.87	31.75	279.14
48	**14	5.00	107.2	49	8.40	42.62	21.20	19.43	9.27	19.29	20.31	284.95
49	**15	5.00	82.9	50	7.80	47.87	19.00	20.52	2.42	21.24	24.95	290.79
50	**16	5.00	86.4	51	8.00	45.86	17.20	21.57	1.57	22.31	22.68	296.60
51	**17	5.00	96.2	52	8.00	43.90	18.40	20.85	3.06	21.42	20.86	302.41
52	**18	5.00	90.9	53	7.20	45.84	19.40	20.31	-4.49	24.16	18.49	308.22
53	**1	5.00	104.3	54	9.80	44.05	15.40	22.79	5.10	24.88	35.88	314.19
MISSING SAMPLE												
55	**3	5.00	113.1		8.40	49.54	18.20	20.97	4.36	21.73	31.74	320.08
56	**4	5.00	62.9		7.20	34.70	14.60	23.41	-2.49	22.64	3.44	325.81
57	**5	5.00	3.9		18.40	21.19	10.80	27.22	9.46	42.06	2.23	331.54
58	**6	5.00	6.0		62727.80	0.34	583.80	3.70	94176.22	66.58	0.01	337.42
59	**7	5.00	4.2		10831.80	0.86	48327.80	0.41	60781.24	17.81	0.00	343.32

blank
 15s
 56kg
 H-3
 LC-14

Beckman standards

W. V. V. P. P. P.
201-445-6488

Wes - Has 4 LSC OUTPUT
- LADD HAS MADE OTHER ADJUSTMENTS FR DENO.

J. M. J.

ID=AUTO DPM 5MIN 16 JUL 1998 15:17
 USER: 4 COMMENT:WES
 PRESET TIME : 5.00
 DATA CALC : AUTO DPM HW #YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : YES ICH : NO REPLICATES : 1 RS232 : OFF
 TWO PHASE : NO AQC :YES CYCLE REPEATS : 1 DISK : OFF
 SCINTILLATOR: LIQUID LUMEX:YES LOW SAMPLE REJ: 0 RWM LIST : OFF
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

ISOTOPE 1: 3H %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0
 ISOTOPE 2: 32P %ERROR: 0.00 FACTOR: 1.000000 BKG. SUB: 0

SAM NO	POS	TIME MIN	HW	3H		32P		3H DPM	3H EFF-1	LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR				
01	**1	5.00	80.0	8.20	37.80	22.00	19.07	34.29	23.91	10.77	5.59
		Blank Average		DPM for 3H :		34.29 COEF. OF VAR:		0.000			
1	**3	5.00	98.6	9.20	39.87	20.40	19.80	8.60	21.45	20.12	11.41
2	**4	5.00	89.0	10.00	34.42	18.60	20.74	7.45	23.96	14.68	17.19
3	**5	5.00	101.1	10.20	36.39	19.40	20.31	13.38	21.40	18.85	22.94
4	**6	5.00	102.4	13.20	32.23	19.00	20.52	24.14	22.59	21.48	28.78
5	**7	5.00	91.4	9.60	36.82	17.20	21.57	-2.51	30.21	18.19	34.58
6	**8	5.00	100.8	9.00	40.52	19.00	20.52	7.94	21.31	20.85	40.38
7	**9	5.00	90.0	9.40	35.36	21.00	19.52	10.98	20.76	12.86	46.19
8	**10	5.00	95.7	11.80	30.14	21.00	19.52	20.33	21.60	11.07	51.95
9	**11	5.00	91.0	22.60	21.32	18.00	21.08	34.68	32.76	14.23	57.79
10	**12	5.00	105.9	7.80	51.59	17.20	21.57	1.37	21.87	30.99	63.62
11	**13	5.00	95.6	8.60	40.03	16.40	22.09	1.69	23.90	19.07	69.45
12	**14	5.00	141.8	10.80	46.33	17.80	21.20	18.59	20.42	39.90	75.33
13	**15	5.00	90.9	9.80	35.60	18.60	20.74	14.36	20.14	15.61	81.16
14	**16	5.00	107.5	6.80	54.60	22.80	18.73	*****	0.00	24.12	86.99
COUNT RATE TOO LOW OR TOO COMPRESSED											
15	**17	5.00	113.2	5.80	57.75	17.80	21.20	1.06	16.41	24.51	92.81
16	**18	5.00	106.5	10.80	39.05	19.80	20.10	12.43	23.11	26.39	98.68
17	**1	5.00	96.6	11.40	35.11	17.00	21.69	12.37	24.43	23.09	104.60
18	**2	5.00	107.9	7.40	45.90	17.00	21.69	-0.92	22.17	21.23	110.42
19	**3	5.00	122.6	8.20	52.83	19.00	20.52	0.29	23.71	33.86	116.29
20	**4	5.00	88.8	10.20	33.97	21.20	19.43	9.55	23.27	13.92	122.07
21	**5	5.00	95.4	7.40	42.92	22.20	18.98	1.99	20.40	13.74	127.84
22	**6	5.00	82.0	8.80	36.37	21.60	19.25	4.23	22.84	11.87	133.65
23	**7	5.00	93.1	6.20	51.65	21.00	19.52	1.43	17.36	18.85	139.48
24	**8	5.00	84.1	9.00	38.77	18.40	20.85	6.83	21.89	18.12	145.30
25	**9	5.00	93.8	8.60	40.57	20.60	19.71	3.88	22.53	17.39	151.10
26	**10	5.00	93.9	7.40	43.60	16.00	22.36	-4.67	24.98	18.65	156.91
27	**11	5.00	93.3	7.00	52.11	17.80	21.20	3.56	18.50	26.20	162.72
28	**12	5.00	85.8	9.00	34.72	16.20	22.22	1.49	25.15	12.33	168.50
29	**13	5.00	92.8	8.00	45.86	19.00	20.52	6.65	19.54	23.34	174.35
30	**14	5.00	92.9	11.20	30.73	18.40	20.85	7.28	26.94	12.23	180.15
31	**15	5.00	94.5	5.60	52.03	18.40	20.85	-8.09	21.37	16.68	185.94
32	**16	5.00	88.5	9.80	39.39	21.00	19.52	11.09	21.59	21.75	191.77
33	**17	5.00	110.2	6.40	48.03	16.20	22.22	-1.52	19.53	19.05	197.57
34	**18	5.00	94.6	10.20	33.97	21.00	19.52	12.31	21.89	12.87	203.40
35	**1	5.00	93.7	11.00	32.94	21.40	19.33	6.82	26.75	14.89	209.32

	5.00	101.9	8.20	45.54	21.40	19.33	0.81	23.36	22.97	220.99
	5.00	92.9	6.40	46.37	16.60	21.95	-7.60	23.98	16.87	226.77
-5	5.00	89.2	10.40	35.27	22.60	18.81	16.27	20.57	16.22	232.57
**6	5.00	99.7	7.40	50.75	18.20	20.97	-3.16	23.77	27.95	238.39
+1 **7	5.00	93.9	5.80	50.23	18.20	20.97	*****	0.00	16.33	244.17

SAM NO	POS	TIME MIN	HH	3H		32P		3H DPM	3H EFF-1	LUMEX %	ELAPSED TIME
				CPM	%ERROR	CPM	%ERROR				
COUNT RATE TOO LOW OR TOO COMPRESSED											
42	**8	5.00	92.0	9.20	37.16	14.60	23.41	6.08	22.79	16.65	249.98
43	**9	5.00	92.7	8.00	43.04	18.40	20.85	-1.22	24.19	20.90	255.79
44	**10	5.00	110.7	11.80	31.99	16.20	22.22	15.79	23.56	16.31	261.61
45	**11	5.00	114.2	6.80	45.97	15.60	22.65	-8.49	26.36	18.09	267.41
46	**12	5.00	195.2	7.00	69.88	21.20	19.43	18.40	13.28	41.71	273.29
47	**13	5.00	105.7	8.40	50.00	19.40	20.31	4.12	21.87	31.75	279.14
48	**14	5.00	107.2	8.40	42.62	21.20	19.43	9.27	19.29	20.31	284.95
49	**15	5.00	82.9	7.80	47.87	19.00	20.52	2.42	21.24	24.95	290.79
50	**16	5.00	88.4	8.00	45.86	17.20	21.57	1.57	22.31	22.65	296.60
51	**17	5.00	96.2	8.00	43.90	18.40	20.85	3.06	21.42	20.86	302.41
52	**18	5.00	90.9	7.20	45.84	19.40	20.31	-4.49	24.16	18.49	308.22
53	**1	5.00	104.3	9.80	46.05	15.40	22.79	5.10	24.88	35.88	314.19
MISSING SAMPLE											
55	**3	5.00	113.1	8.40	49.54	18.20	20.97	4.36	21.73	31.74	320.08
56	**4	5.00	62.9	7.20	34.70	14.60	23.41	-2.49	22.64	3.44	325.81
57	**5	5.00	3.9	18.40	21.19	10.80	27.22	9.46	42.06	2.23	331.54
58	**6	5.00	6.0	62727.80	0.36	583.80	3.70	94176.22	66.58	0.01	337.42
59	**7	5.00	4.2	10831.80	0.86	48327.80	0.41	60781.24	17.81	0.00	343.32

Survey of Room [REDACTED]



Internal Memo

From: James R. Matey
SW-220
734-2868
Date: 6/11/99

To: Distribution

Subject: Decommissioning of EN-116 and [REDACTED] (revised 6/11/99)

EN-116 and [REDACTED] have been used for experiments with P-33 and the -80 freezer in [REDACTED] has been used for storage of P-32. Work with these materials ceased in February 1999 (EN-116) and April 1999 [REDACTED]. At those times, surveys and swipe tests were performed, several areas of low level contamination were identified and cleaned, and surveys and swipes were repeated in those areas. The results of the surveys and swipe tests were reported in the Radiation Safety Officer's Semi-Annual Audit, April 1999.

This report is a follow-up to the audit, to provide documentation for release of [REDACTED] and EN-116 to general use, as discussed with the users of those rooms. According to the NRC, facilities and equipment can be released for unrestricted use if the levels of removable and fixed surface contamination are below NRC defined levels, which vary depending on the isotope.

According to the NRC, the acceptable level of removable contamination of pure beta emitters such as P-32 and P-33 is 1000 dpm/100 cm². The highest swipe value, after decontamination, in [REDACTED] and EN-116 was 20 dpm for swipes, which covered in excess of 100 cm². Hence, the level of removable contamination in both of these rooms is acceptable for unrestricted use.

The acceptable level of fixed contamination of pure beta emitters such as P-32 and P-33 is 5000 dpm/100 cm² on the average and 15,000 dpm/100 cm² maximum. Our survey meter reports in cpm. In order to convert from cpm to dpm/100 cm² we can use the algorithms laid out in MARSSIM¹ section 6.7.2. For a background of 50 cpm, we interpolate Table 6.6 to get a MDCR (minimum detectable count rate) of 54 cpm. Using an instrument efficiency² of 9% for our Ludlum Model 3/44-9 survey meter and pancake probe, a surface efficiency of 54%, a probe area of 12 cm² and a surveyor efficiency of 50%, we obtain a minimum detectable concentration (MDC) of ~ 14,000 dpm/100 cm². Since none of the survey areas were above background, the maximum level of fixed contamination at the time of the surveys was 14,000 dpm/100 cm². In the time since the surveys were taken, a fixed contamination of 14,000 dpm/100 cm² would have decayed to less than 500 dpm/100 cm² for EN-116 and 1900 dpm/100 cm² for [REDACTED]. Hence, at this time, the level of fixed contamination is acceptable for unrestricted use.

Since P-32 has a higher detection efficiency and a shorter half life, the same arguments apply for any fixed contamination of P-32.

In short, EN-116 and [REDACTED] meet NRC recommendations for release to unrestricted use. I will remove the signage on these rooms. The closet for [REDACTED] will remain restricted, since we are storing contaminated fixtures there - until the contamination has decayed.

The only other areas in which we are using or storing licensed materials are the radiation safety lab in W402B and the radioactive waste storage area in the Pond Building.

At present, there are no plans for further work with loose, licensed, radioactive materials. Should plans change, I need 2 months notice for resumption of radioactive materials work in EN-116 or [REDACTED].

1 Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575 (US Government Printing Office, 1997)

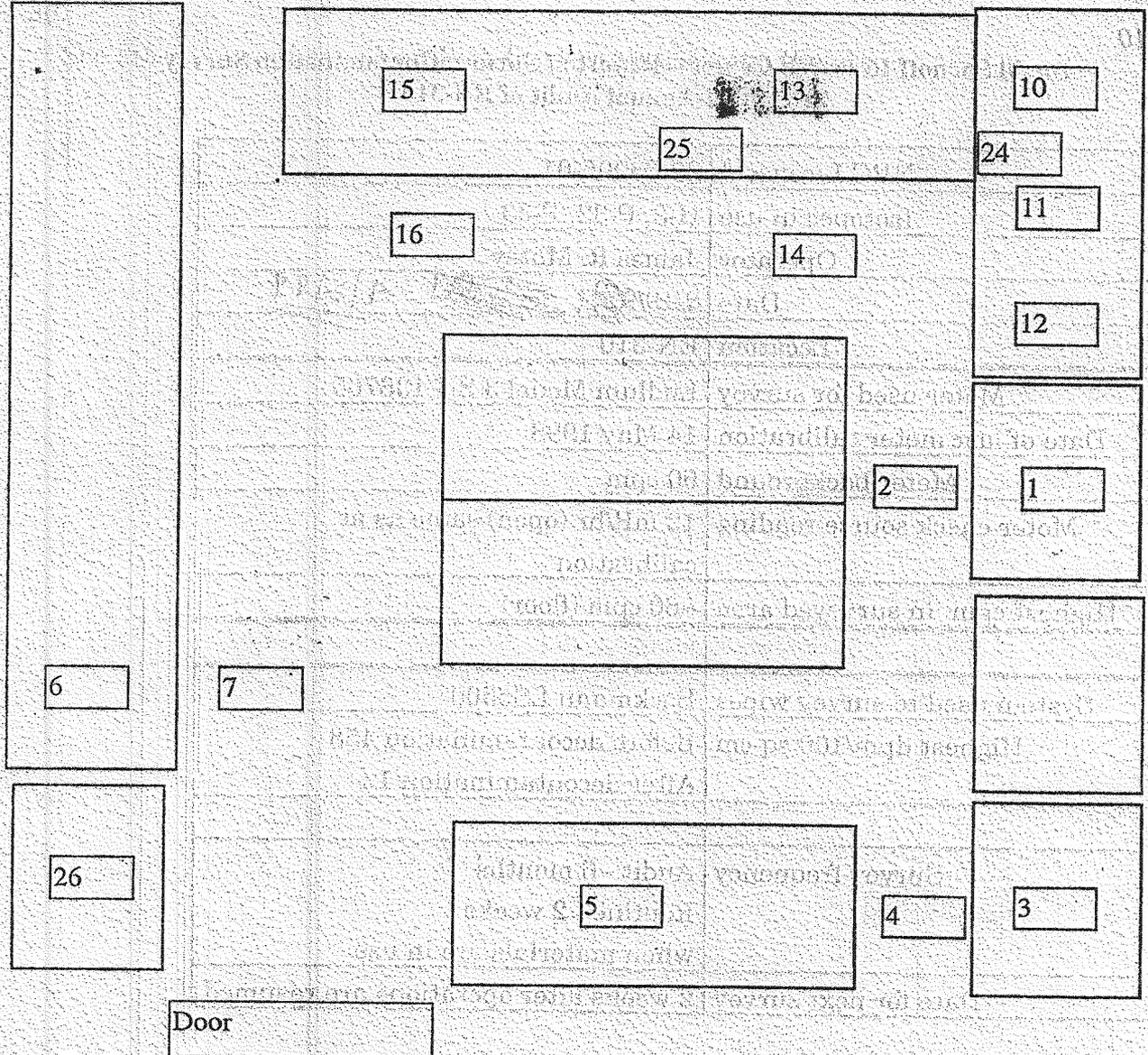
2 Interpolated from the manufacturer's specifications.

David Sarnoff Research Center – Report of Surface Contamination Survey
RSO Semi-Annual Audit of [REDACTED]

NRC License #	29-28005-01
Isotopes in use	H-3, P-32, P-33
Operator	James R. Matey
Date	2/19/99 3/19/99 4/2/99
Location	[REDACTED]
Meter used for survey	Ludlum Model 3 SN 136765
Date of last meter calibration	14 May 1998
Meter background	60 cpm
Meter check source reading	12 mR/hr (open) same as at calibration
Highest cpm in surveyed area	~60 cpm (floor)
System used to survey wipes	Beckmann LS6500
Highest dpm/100 sq-cm	Before decontamination 458 After decontamination 12
Survey frequency	Audit - 6 months Routine - 2 weeks when materials are in use
Date for next survey	2 weeks after operations are resumed

- 1.) Record individual readings in table with a sketch of the area surveyed. You may want to keep a partly filled out form on hand to duplicate for future surveys.
- 2.) Note any special conditions below
- 3.) If contamination levels require a decontamination to be done (200 dpm or higher/100 cm²), repeat the survey after decontamination, recording the results in the table, with appropriate annotation.

Notes: Hot spots on tools, the electrophoresis unit and on the floor in front of the hot bench have been cleaned and retested. All cleaned up except for a pipette which will be done.



#	Description	Survey (fixed/removable CPM)	Isotope	Swipe Counts (removable dpm)
1	Work surface	60	P33	8
2	Floor	60	P33	109 before cleaning; 0 after
3	-80 freezer	60	P33	13
4	Floor	60	P33	111 before cleaning; 5 after
5	LSC	60	P33	1
6	Sink	60	P33	0
7	Floor	60	P33	32
8	None	--	--	--
9	Waste container	60	P33	0
10	Gel dryer	60	P33	2
11	Thermocycler	60	P33	458 before cleaning, 0 after
12	Centrifuge	60	P33	9
13	Gel bench	60	P33	3
14	Floor	60	P33	107 before cleaning, 8 after
15	Microscale bench	60	P33	0
16	Floor	60	P33	39
17	Gel rack #1	60	P33	7
18	Gel rack #2	60	P33	2
19	Shield & tray	60	P33	1
20	Pipette carousel	60	P33	6
21	Smart Power 4000	60	P33	17
22	Universal Vacuum System	60	P33	9
23	Small centrifuge	60	P33	25
24	Bench	60	P33	0
25	Drawer	60	P33	3
26	Desk	60	P33	0
27	Door handles	60	P33	0
28	Background	60	P33	4

NOTE: Swipes below background are listed as 0.

Survey of Room EN-302

David Sarnoff Research Center
Internal Correspondence

a subsidiary of SRJ International

FEB - 9 1996

Thursday, February 08, 1996 11:00 AM

To: Radiation Safety Files
From: J. R. Matey **Location:** E-321 **Phone:** 2868
Subject: Decommissioning of EN-302 Radiation Lab

EN-302 had been used as the site of the Liquid Scintillation System (LSC). The LSC was moved to [REDACTED] on 7 February 1996. Paul Mitsis performed wipe tests on the bench used for the LSC in EN-302 after the LSC was moved. The wipes were counted twice and analyzed in the attached spreadsheet.

There is no evidence for any residual contamination – nor did we expect any. Hence, I have removed the radiation warning signs from EN-302 and returned it to normal use.

[REDACTED] has been posted as a controlled area. NRC-3 and radiation warning signs are in place. I have advised J. Eldridge and Jim Rust that

Custodians, facilities staff and guards should not enter [REDACTED] EN-307 or any other room posted with a radioactive materials sign unless accompanied by the radiation safety officer (Jim Matey) or a person authorized to use the radioactive materials.

Copies to

Facilities

T. Bordieri
J. Eldridge
J. Rust
W. Schmidlin
D. Tamutus

Radiation Safety Committee

Rhoda Brown
Fred Dixon
P. N. Yocom

EN-302 2-8-96

	A	B	C	D	E	F	G
1	Title:	Analysis of Wipe Test Data					
2							
3	Authors:	J. R. Matey					
4		David Sarnoff Research Center, CN 5300 Princeton, NJ 08543					
5		609-734-2868					
6							
7	Description:	Analysis of wipe test data. Based on					
8							
9		"The Minimum Detectable Activity Concept"					
10		EG&G Ortec System Applications Study PSD #17					
11		by Joseph C. Lochamy					
12							
13		Also published in NBS Special Publication 456					
14		Measurements for the Safe Use of Radiation (1976)					
15		page 169					
16							
17	Constants:						
18							
19	Number of measurements	2					
20	Confidence factor (95%)	1.65					
21							
22	Measurement	Background	Wipe 1	Wipe 2	Background	Wipe 1	Wipe 2
23	Number	H-3 DPM	H-3 DPM	H-3 DPM	P-32 DPM	P-32 DPM	P-32 DPM
24							
25		1	39	40	20	22	19
26		2	27	24	21	19	15
27							
28	Average	33					
29	Std. Dev.	8					
30	Expected Std. Dev.	6					
31	Standard error of average	6					
32	Pooled Standard Error of Average	8					
33							
34	Net (compared to background)		-1	-13		-18	-14
35	Net + confidence level		13	1		-4	0
36							
37	Lower Limit of Detection(net DPM)		19				

ID:WIPE TESTS

7 FEB 1996 14:21

USER: 9 COMMENT:
 PRESET TIME : 1.00
 DATA CALC : DL DPM H# :YES SAMPLE REPEATS: 1 PRINTER : STD
 COUNT BLANK : NO IC# : NO REPLICATES : 1 RS232 : OFF
 TWO PHASE : NO AQC :YES CYCLE REPEATS : 2 DISK : STD
 SCINTILLATOR: LIQUID LUMEX: NO LOW SAMPLE REJ: 0
 LOW LEVEL : NO HALF LIFE CORRECTION DATE: none

*Duplicate Wipe Tests
 For EU302 -
 Former Scintillation Counter
 Bench*

ISOTOPE 1: 3H ZERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0
 ISOTOPE 2: 32PCUT ZERROR: 2.00 FACTOR: 1.000000 BKG. SUB: 0

BACKGROUND QUENCH CURVE: Off COLOR QUENCH CORRECTION: Off

Quench Limits Low:20.000 High:323.70

SAM NO	POS	TIME MIN	H#	3H		32PCUT		3H DPM	32PCUT DPM	3H 32PCUT		RATIO	LUMEX %	ELAPSED TIME		
				CPM	ZERROR	CPM	ZERROR			EFF-1	EFF-2					EFF-1
1	11-1	1.00	39.0	25.00	40.00	17.00	48.51	39.60	19.03	62.75	0.00	0.79	89.33	2.081	3.25	1.47 Wipe
2	11-2	1.00	39.7	13.00	55.47	21.00	63.64	20.46	23.51	62.61	0.00	0.79	89.33	0.870	3.65	2.99 Wipe
3	11-3	1.00	44.3	24.00	40.82	20.00	44.72	38.62	22.39	61.68	0.00	0.80	89.31	1.725	3.49	4.53 Bkg

Cycle 2 of 2

1	11-1	1.00	39.5	15.00	51.64	11.00	60.30	23.79	12.31	62.64	0.00	0.79	89.33	1.932	4.97	6.52 Wipe
2	11-2	1.00	40.1	13.00	55.47	13.00	55.47	20.61	14.55	62.53	0.00	0.79	89.32	1.416	4.41	8.06 Wipe
3	11-3	1.00	43.7	17.00	48.51	17.00	48.51	27.26	19.04	61.80	0.00	0.80	89.31	1.432	4.13	9.57 Bkg