CT.2-5

PRELIMINARY SURVEY OF BRIDGEPORT BRASS COMPANY SEYMOUR, CONNECTICUT

Work performed
by the
Health and Safety Research Division
Oak Ridge National Laboratory
Oak Ridge, Tennessee 37830

March 1980

OAK RIDGE NATIONAL LABORATORY
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY
as part of the
Formerly Utilized Sites--
Remedial Action Program

BRIDGEPORT BRASS COMPANY
SEYMOUR, CONNECTICUT

At the request of the Department of Energy (then ERDA), a preliminary survey was performed at the Bridgeport Brass Company in Seymour, Connecticut (Fig. 1) on January 26, 1977, to assess the radiological status of those facilities used under Atomic Energy Commission (AEC) contract during the period 1962 through 1964. Mr. Edwin F. Rich, Plant Engineer, provided information about the project and identified those areas utilized in the project. Contract work involved the developmental process of cold-forming (extrusion) of natural uranium metal, associated storage, and laboratory support. This operation was moved to the site from the Company's Havens Laboratory, Bridgeport, Connecticut, in 1962.

Present Use of Facilities

From information contained in ERDA records and that obtained during the survey, the extrusion operations were conducted in a portion of only one building (area approximately 30 x 100 ft). An adjacent area of similar size was used for uranium and general storage, machine shop, cutting and grinding room, and laboratory hood area (Fig. 2). The area is now a printing plant with associated offices, warehousing, etc., owned by National Distillers and Chemical Corporation. Bridgeport Brass Company is a subsidiary of this company. It was determined that the Health and Safety Laboratory (HASL) conducted a radiological survey of the facility in 1964 when the project terminated (report attached).

Results of Preliminary Survey

The preliminary survey was conducted by H. W. Dickson and M. T. Ryan of the Oak Ridge National Laboratory and W. T. Thornton of the DOE/Oak Ridge Operations Office (then ERDA). A survey was conducted in the former Dynapak Extrusion Area, in an adjacent area used for uranium storage (see Fig. 2), in a space formerly used for offices, and in an area above the former office area (see Fig. 3). The survey consisted of gamma-ray exposure-rate measurements 1 m above the floor surface,

beta-gamma dose-rate measurements 1 cm above the surface, and direct alpha radiation measurements made at contact with the surface.

Gamma-ray measurements in the former extrusion area (Fig. 2) resulted in a maximum reading of 9 μR/hr 1 m above the surface. The maximum beta-gamma dose rate 1 cm from the surface in that area was 0.6 mrad/hr, and the maximum gamma-ray exposure rate was 50 μR/hr 1 cm from the surface. The maximum direct alpha radiation measured was 300 dpm/100 cm^2. In the former storage area just outside the extrusion plant, the following maximum readings were observed: 6 μR/hr gamma-ray exposure rate 1 m above the surface, 0.20 mrad/hr beta-gamma, and 30 μR/hr gamma-ray exposure rate at 1 cm from the surface. No alpha activity above background was detected in this area. In the former office area (now print shop) (Fig. 3), the following maximum readings were observed: 8 μR/hr gamma-ray exposure rate at 1 m above the surface, 1.75 mrad/hr beta-gamma, and 130 μR/hr gamma-ray exposure rate at 1 cm from the surface. The corresponding direct alpha radiation measured at this point (crack in concrete floor) was 180 dpm/100 cm^2. All measurements made on the second level of the facility were at background levels.

An effort was made to confirm radiation levels presented in a report of a survey conducted by A. J. Breslin, former HASL, October 21, 1964 (see attached report). Most of the current measurements were found to be in agreement with those in the 1964 survey and within existing Nuclear Regulatory Commission guidelines for unrestricted use. However, in one area, radiation levels were found to approach or exceed these guidelines. Because of this, some additional measurements should be taken at this site.

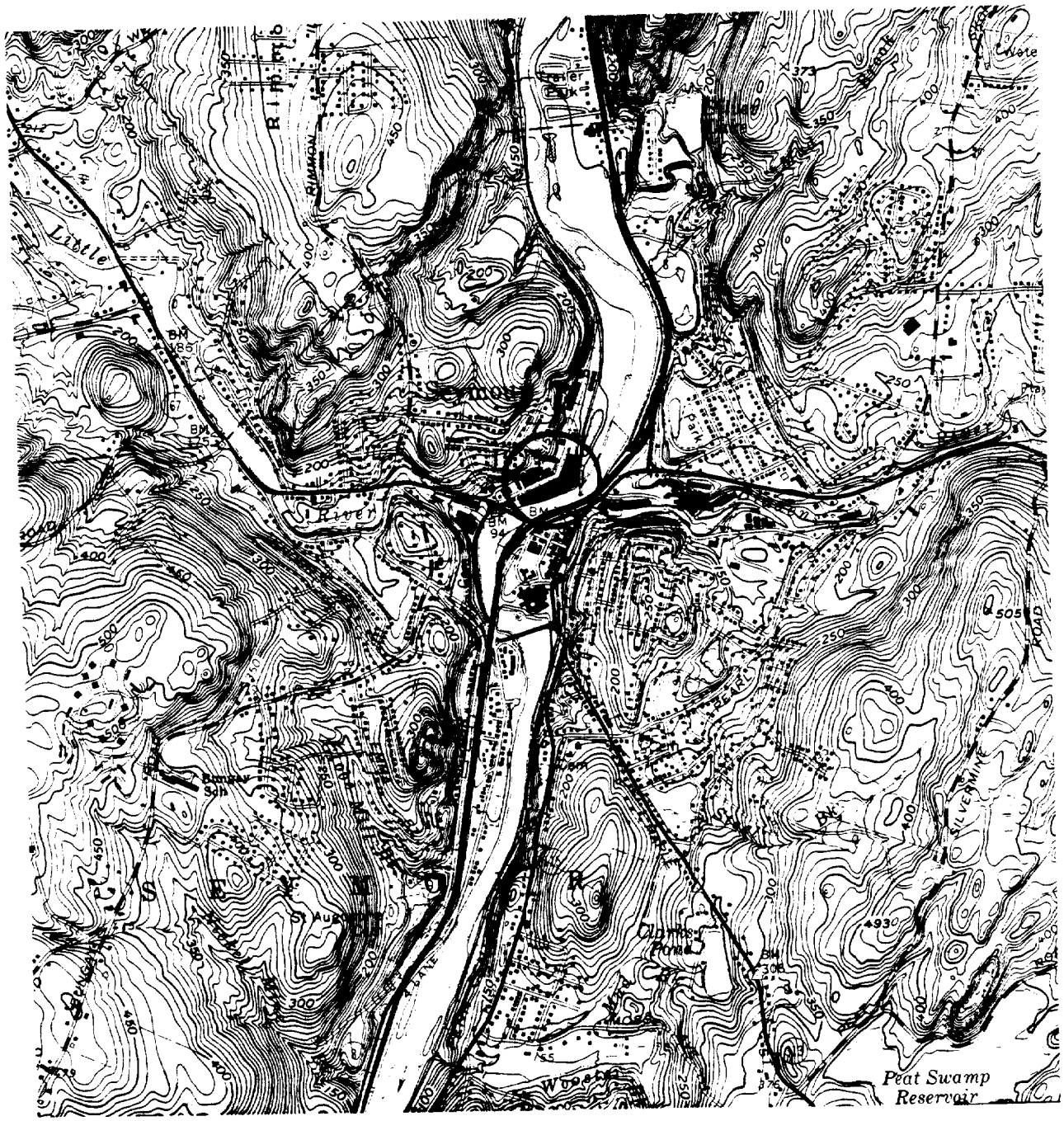


Fig. 1. Location of the Bridgeport Brass Company in Seymour, Connecticut.

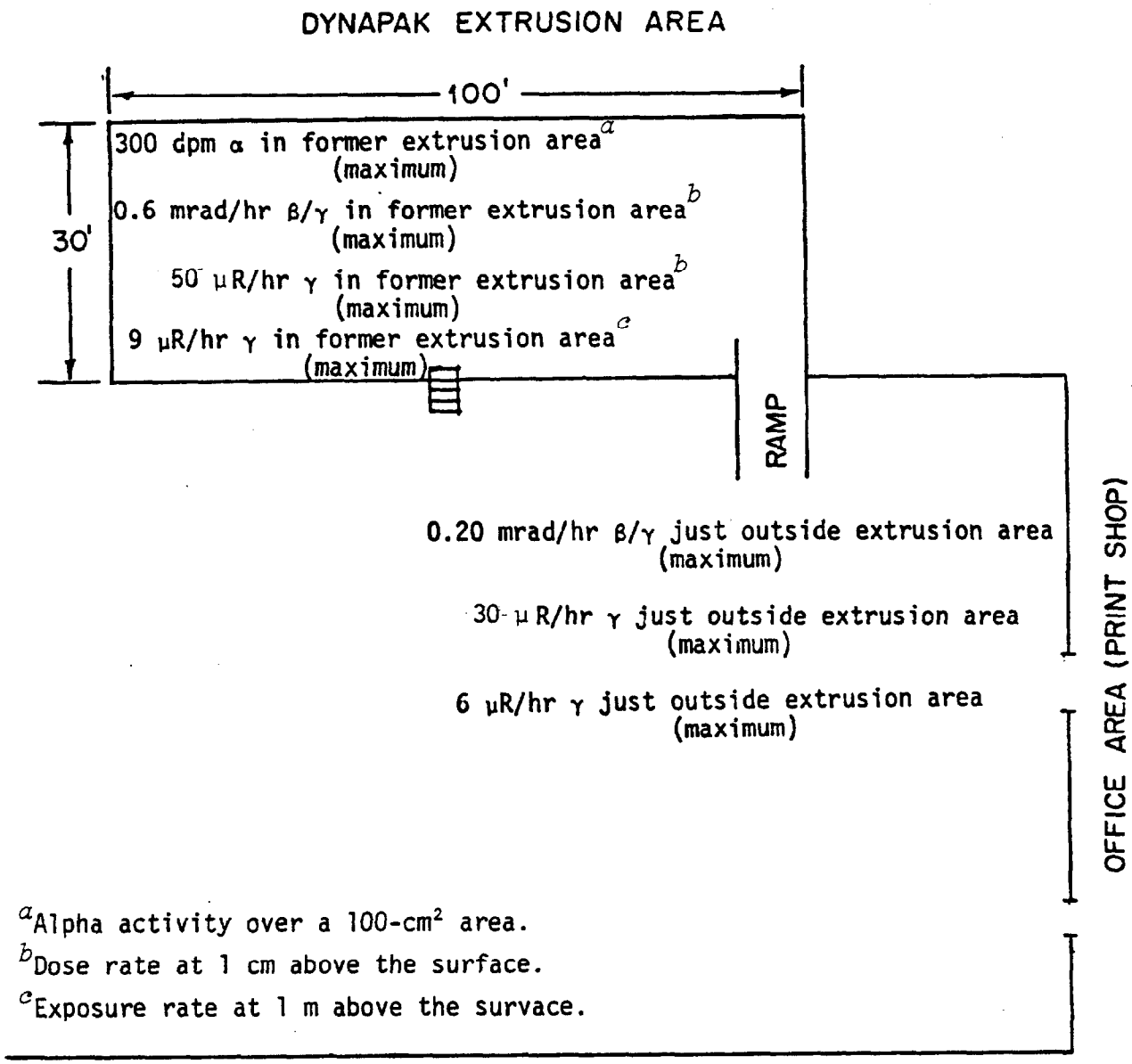


Fig. 2. Location and radiation levels inside the area once used for extrusion operations at the Bridgeport Brass Company site.

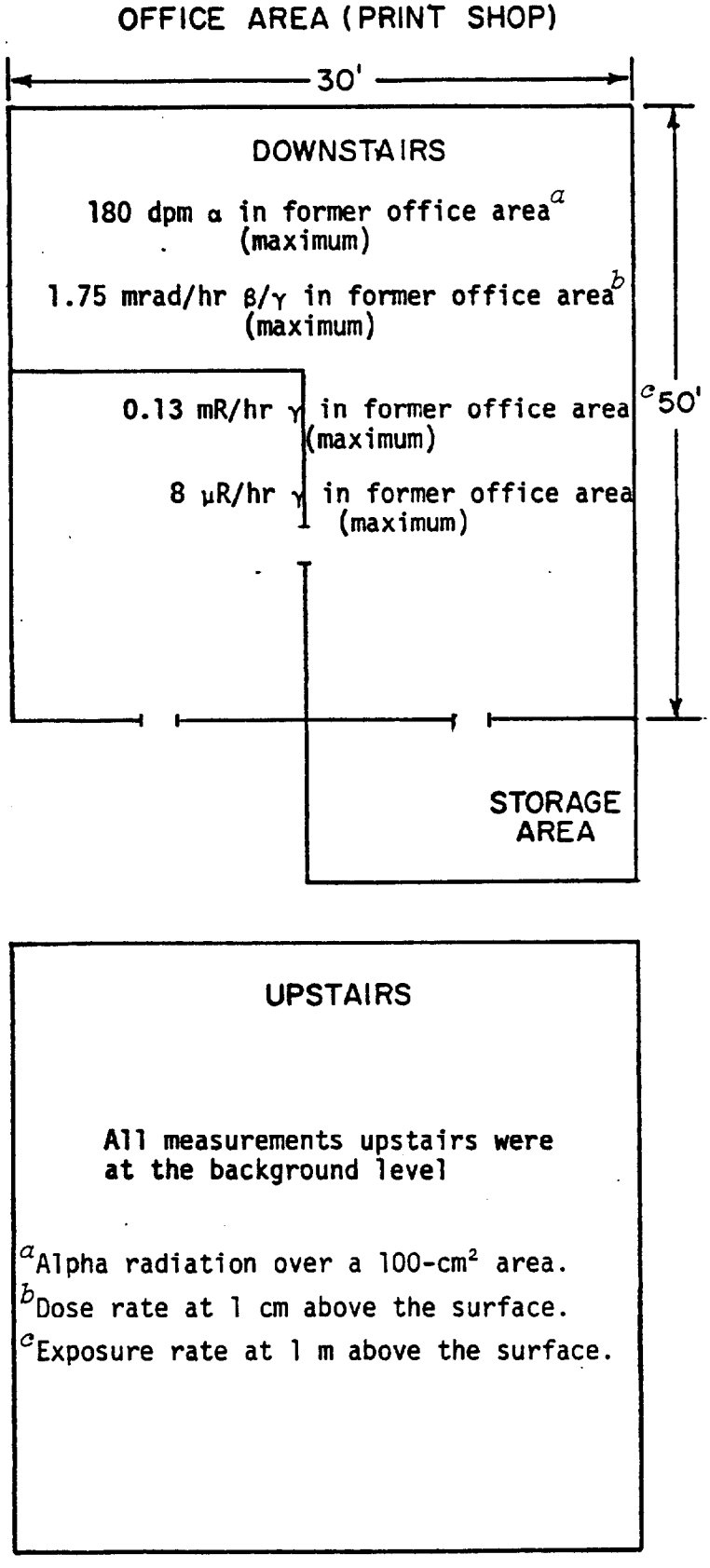


Fig. 3. Location and radiation levels inside the area used for office operations at the Bridgeport Brass Company site.

Bud — 11/5/64
Frank — 11/5/64
Return to AWG

OCT 30 1964

John W. Ruch, Director
Feed Materials Division - OR

A. J. Breslin, Director
Health Protection Engineering Division, HASL, NY

CONTAMINATION SURVEY AT REACTIVE METALS, INC., SEYMOUR, CONNECTICUT

HSH:AJB

Summary
Accompanied by Mr. A. Grella of Reactive Metals, on October 21, 1964, I visited the Seymour facility, formerly occupied by Reactive Metals, to perform the survey requested in your telegram to Dr. Harley dated October 7. We inspected all rooms that were related to AEC contract activities and measured surface contamination in the following areas: machine shop, metal storage area, lab hood area, cutting and grinding room, and Dynapack area. All rooms were free of process and office equipment and were clean in appearance. Local exhaust ventilation systems had been removed from the process areas. The only fixtures and equipment in evidence were lighting fixtures, electrical, gas and compressed air services, air conditioning systems, and a few portable fire extinguishers.

In my judgment, the process areas have been cleaned of uranium contamination satisfactorily and can be released for unrestricted use.

Survey
Following facility decontamination by Reactive Metals, but prior to my visit, Mr. Grella had performed a detailed survey of floor contamination. His measurements were made on grid patterns established for each of the process areas. His survey results are shown in Figures 1 - 4.

My measurements were performed at locations selected randomly from the same grid patterns, covering about one-third of the locations included in his survey. (It should be noted that the locations were only approximately the same.) In addition, I measured contamination on a few surfaces above the floor such as window sills and shelves. The results are shown in Figures 5 - 9. Numbers on the floor plans correspond to those on Mr. Grella's diagrams. The circled numbers indicate locations at which measurements were obtained.

An Eberline PAC 1SA alpha survey meter and a Universal Atomics Model #700 beta-gamma survey meter were used for contact measurements. Smear sampling consisted of rubbing a one inch diameter filter paper over an area of approximately 100cm^2.

Measurements with the Eberline PAC 1SA are reported in Figures 5 - 9 in counts/minute/60 square centimeters. Those values may be converted approximately to disintegrations/minute/100 square centimeters, the usual units for surface contamination, by subtracting an instrument background of 100 counts/minute and multiplying the result by 4. In using this calculation, surface roughness is neglected. Consequently, contamination is underestimated to some degree.

The beta-gamma measurements are reported in units of millirad/hour. Any measurement up to .05 millirad/hour is equivalent to background.

The smear measurements are reported directly as net alpha disintegrations/100 square centimeters.

Results

Taking the measurements in all areas into account, 50% of the direct alpha measurements were $\leq$ 300 α dis/min/100cm^2, 87% were $\leq$ 2000 α dis/min/100cm^2, and 97% were $\leq$ 3200 α dis/min/100cm^2. The maximum value was 25,000 α dis/min/100cm^2.

The smear measurements were in a rather narrow range of 20 to 90 α dis/min/100cm^2. The single measurement in the lab hood area was 3 α dis/min/100cm^2.

With the exception of three or four values, the beta-gamma measurements did not exceed background. The highest value was 0.5 millirad/hour.

Agreement with Mr. Grella's data is good and certainly within the limits of expected differences for this kind of survey. According to Mr. Grella, the fixed alpha values listed on his survey sheets represent readings from a PAC 1SA corrected for a 50 c/m background. Therefore, a more appropriate heading for his measurements would be "net counts/min/60cm^2."

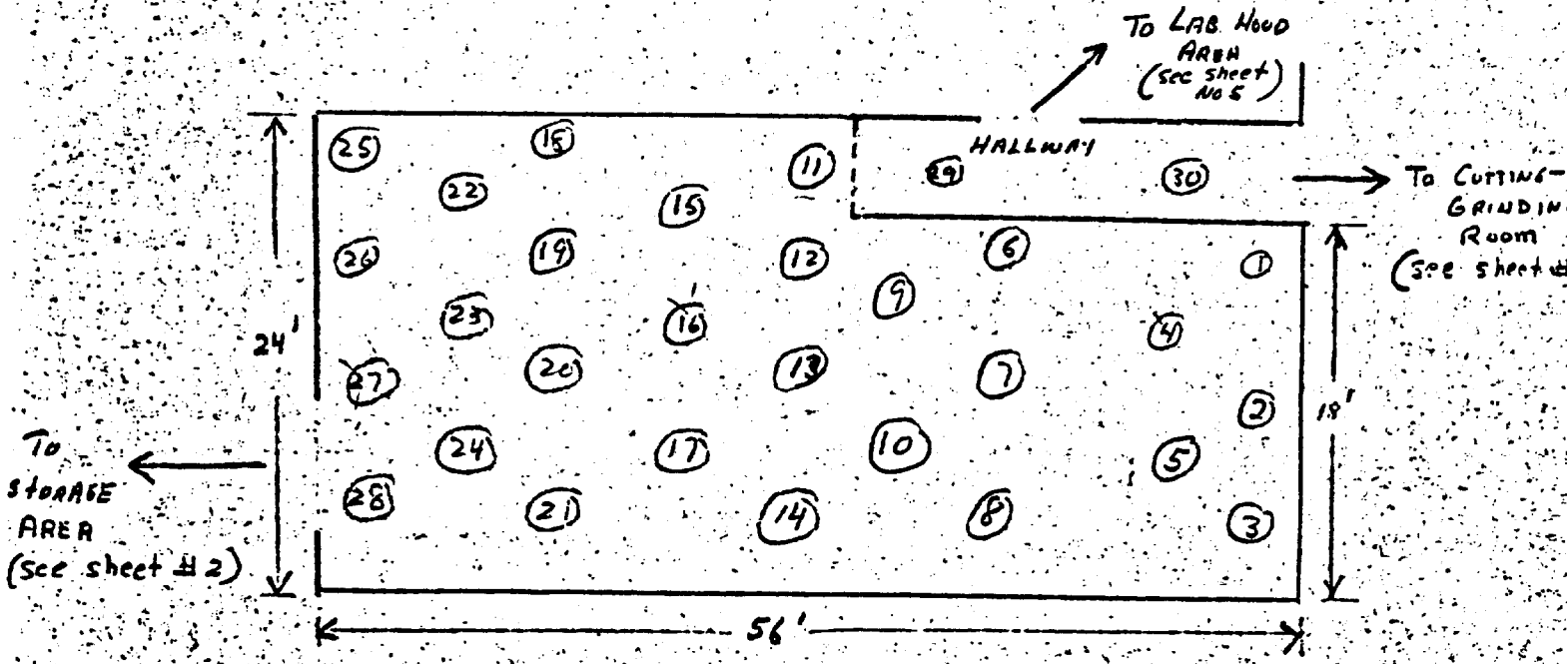
I am not aware of any AEC standards for surface contamination with which the survey data may be compared. However, the values are quite low and certainly are insignificant with respect to any mode of exposure that can be hypothesized.

As a point of reference, these values are well below the limits mentioned in the report "Health Protection Program Review of Special Metals Development Department, Reactive Metals, Inc., Seymour, Connecticut - June 1964" by William A. Pryor and Raymond L. Hervin.

Enclosures:
Figures 1 - 9

cc: C. S. Shoup, OR, w/encl.
A. Grella, RMI, w/Figs. 5-9
J. Hyder, Compliance Div., w/encl.

① MACHINE SHOP

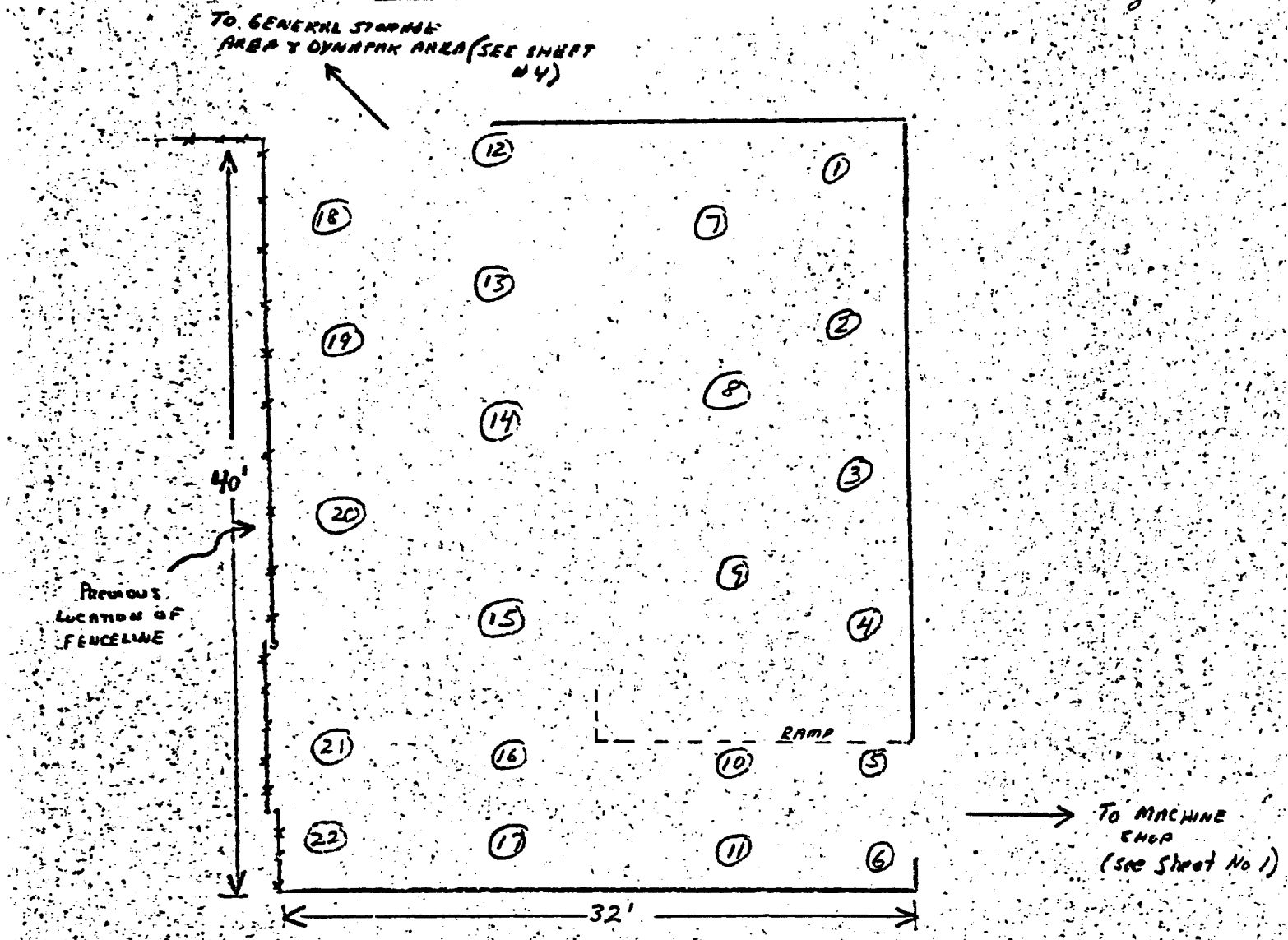


	alpha dlm/100cm² FIXED	alpha dlm/100cm² REMOVABLE	mrad/hr Beta-gamma
1	200	16	.05
2	350	21	.05
3	300	11	.10
4	500	18	.10
5	450	11	.25
6	400	6.5	.05
7	500	9.3	.05
8	400	24.1	.10
9	500	31.8	.20
10	500	23.6	.15
11	300	64.8	.05
12	300	25.8	.15
13	500	17.5	.15
14	100	34.6	.05
15	500	71.9	.05
16	1100	110	.25
17	400	98.3	.05
18	150	51.6	.05
19	600	48.9	.10
20	1000	19.2	.15
21	1300	72.5	.45
22	250	50.5	.05
23	250	42.8	.10
24	250	3.8	.15
25	150	36.8	.20
26	100	39.5	.05
27	400	63.7	.30
28	150	42.8	.10

HALLWAY

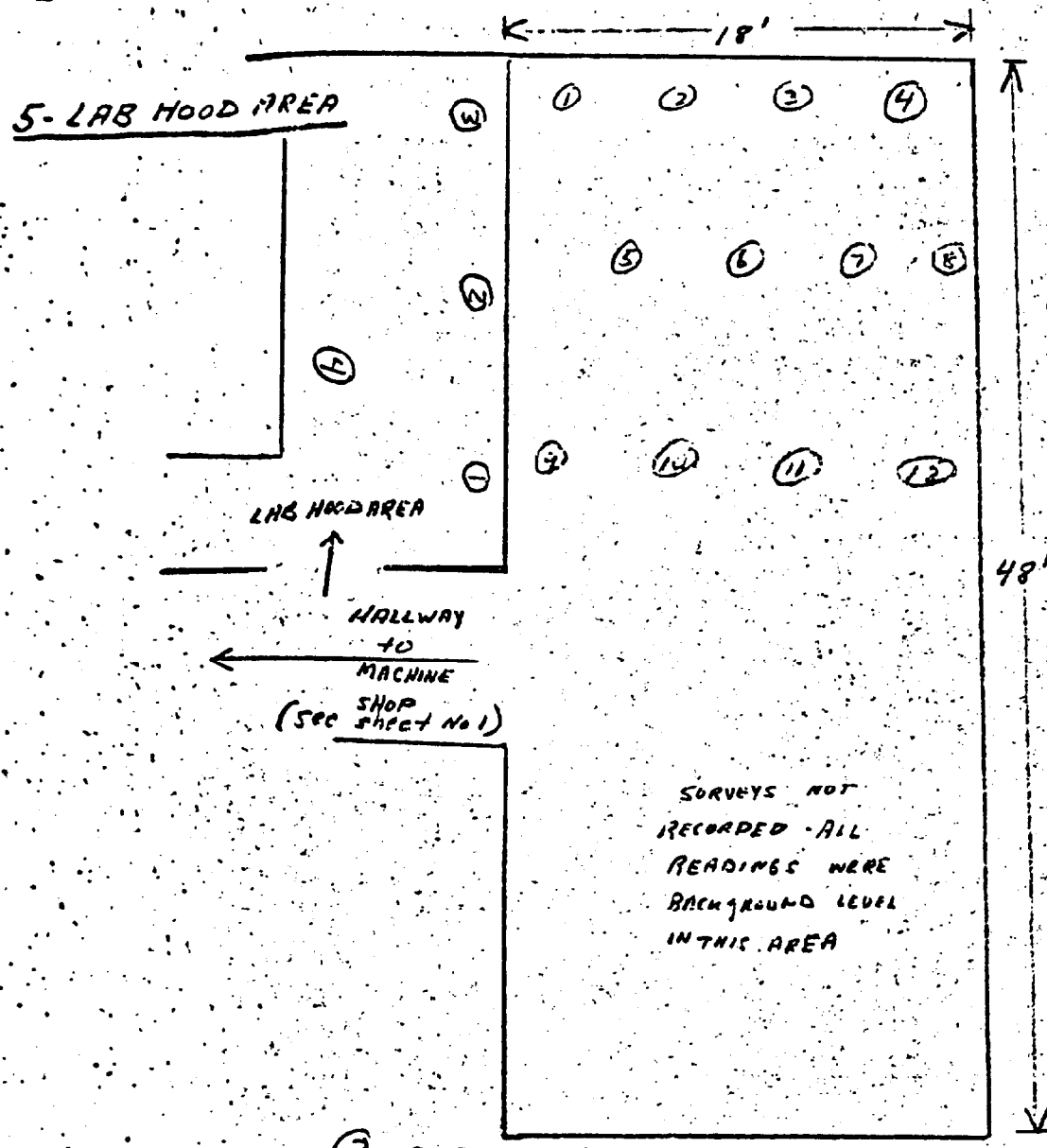
	Fixed alpha	Beta-gamma
29	250	.03
30	250	.02

2 - METAL STORAGE AREA



	Alpha d/m/100 cm² Fixed	Alpha d/m/100 cm² Removable	mrad/hr Beta-gamma
1	50	0.5	0
2	500	71.4	0
3	100	18.6	0
4	100	1.0	0
5	300	9.3	.05
6	200	45.0	0
7	400	47.8	0
8	200	—	.05
9	200	112.0	0
10	150	7.1	0
11	200	28.0	0
12	400	12.6	.05
13	200	14.2	.05
14	400	27.4	.15
15	700	60.9	.30
16	300	39.0	.05
17	200	18.6	0
18	700	52.7	.10
19	200	19.7	.05
20	100	12.6	0
21	150	14.2	.30
22	150	30.7	.30

3 - CUTTING - GRINDING ROOM



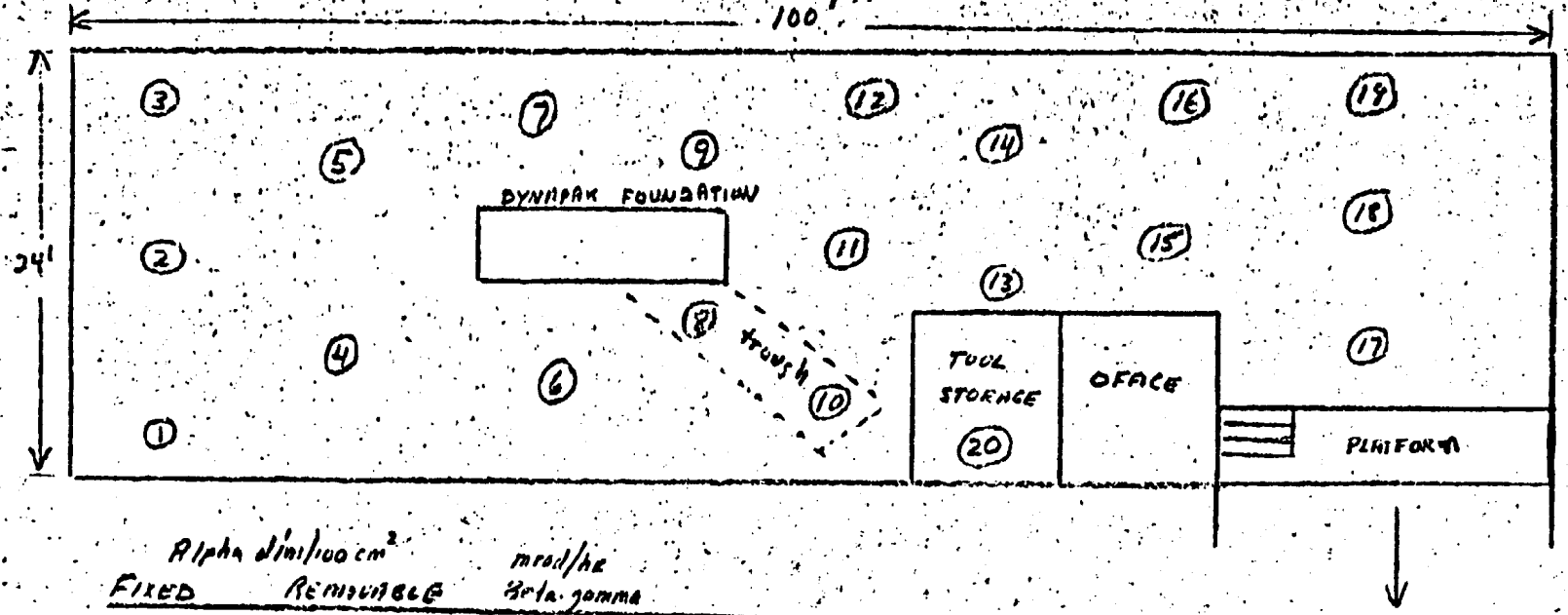
(3) CUTTING - GRINDING ROOM

	ALPHA d/m/sec cm² FIXED	ALPHA d/m/sec cm² REMOVABLE	MREM/HR BETA-GAMMA
1	275	60	.05
2	275	21	.05
3	450	50	.45
4	150	25	0
5	150	20	.05
6	200	28	0
7	200	31	0
8	350	18	.05
9	100	14	0
10	150	31	0
11	50	20	0
12	50	32	0

(5) LAB HOOD AREA

	FIXED ALPHA	BETA-GAMM
1	150	.03
2	200	.02
3	300	.03
4	200	.02

4 - DYNAPAK AREA

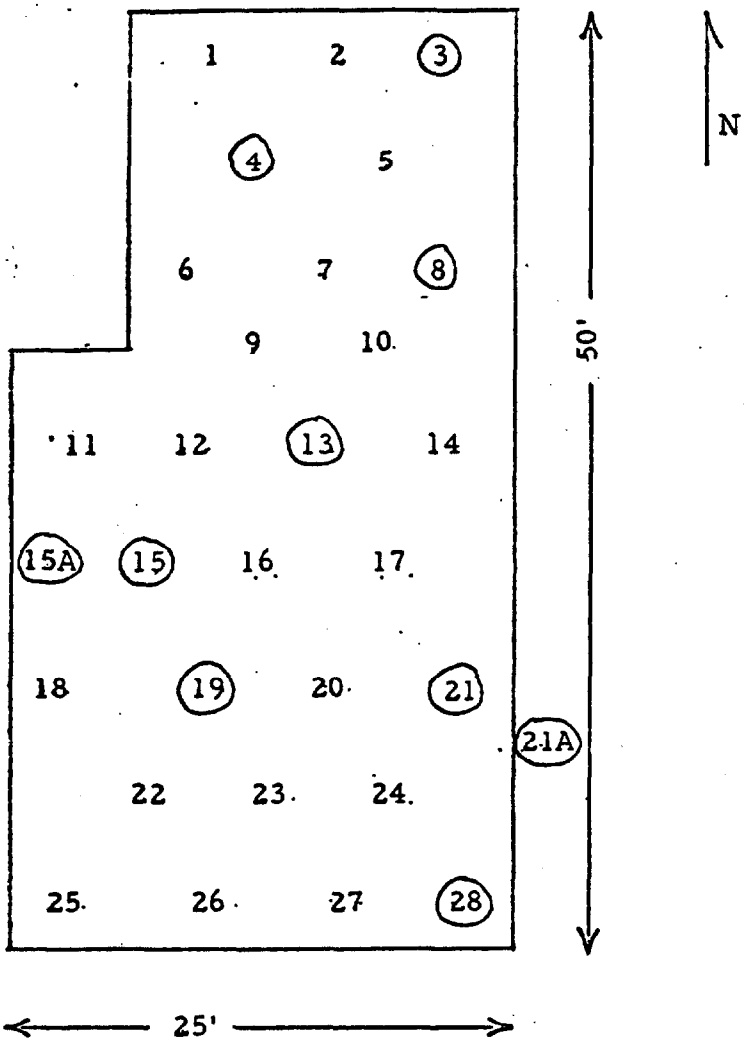


	Alpha d/m/100 cm² FIXED	Alpha d/m/100 cm² REMOVABLE	mrad/hr Beta-gamma
1	100	35.7	0
2	100	8.7	0
3	150	1.6	0
4	200	1.6	0
5	250	13.1	0
6	350	63.7	0
7	350	6.0	0
8	100	8.2	0
9	100	7.1	0
10	—	—	0
11	—	8.7	0
12	—	1.6	0

TO GENERAL STORAGE AND URANIUM STORAGE AREAS
(SEE SHEET No 2)

Fig. 5

MACHINE SHOP

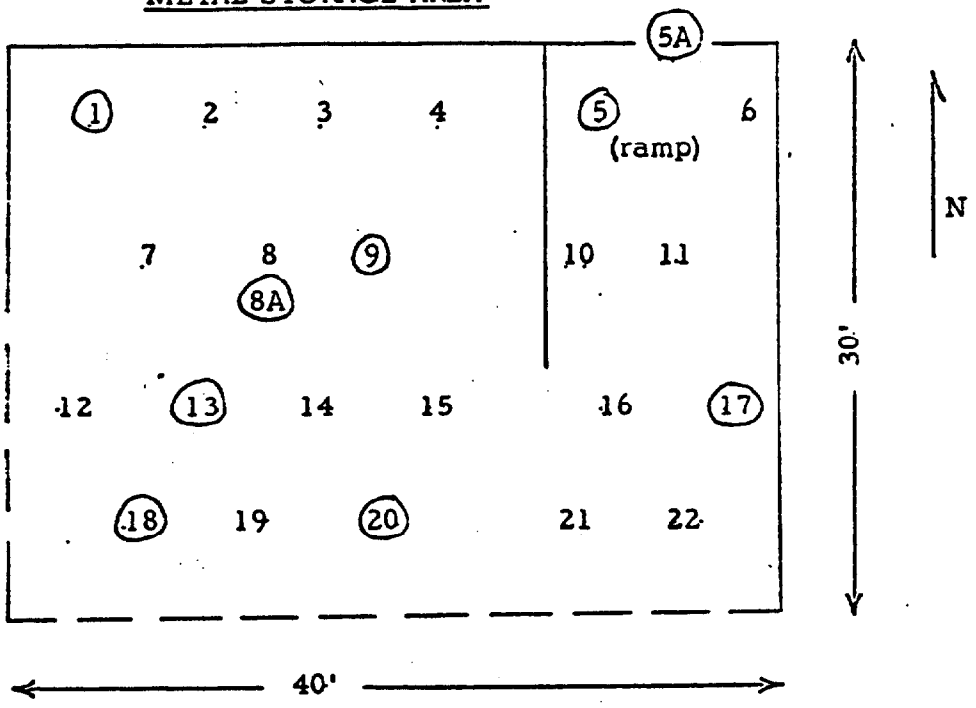


Painted Concrete Floor

Location	Contact Reading α c/m/60cm²	Contact Reading β-γ mrad/hr	Smear α d/m/100cm²
3	400	.03	20
4	400	.04	20
8	500	.02	-
13	800	.05	90
15	600	.05	80
15A(Top of Shelf)	100	-	-
19	900	.02	70
21	6500	.5	-
21A (Window Sill)	300	-	-
28	700	.03	30

HASL - October 19

METAL STORAGE AREA

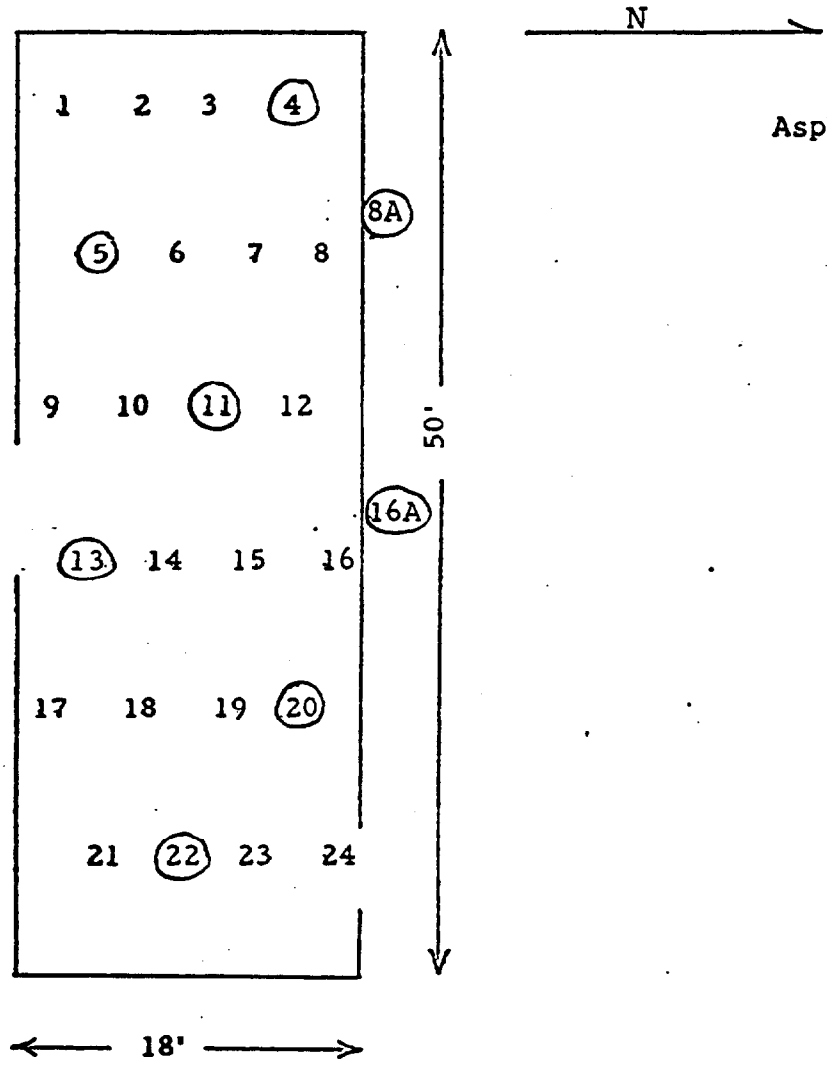


Painted Concrete Floor

Location	Contact Reading α c/m/60cm^2	Contact Reading β-γ mrad/hr	Smear α d/m/100cm^2
1	300	.02	40
5	400	.02	70
5A (Top of roll door housing)	300	-	30
8A (Light fixture)	100	-	60
9	700	.03	80
13	400	.10	80
17	400	.05	80
18	400	.08	-
20	500	.25	70

Fig. 7

CUTTING AND GRINDING ROOM

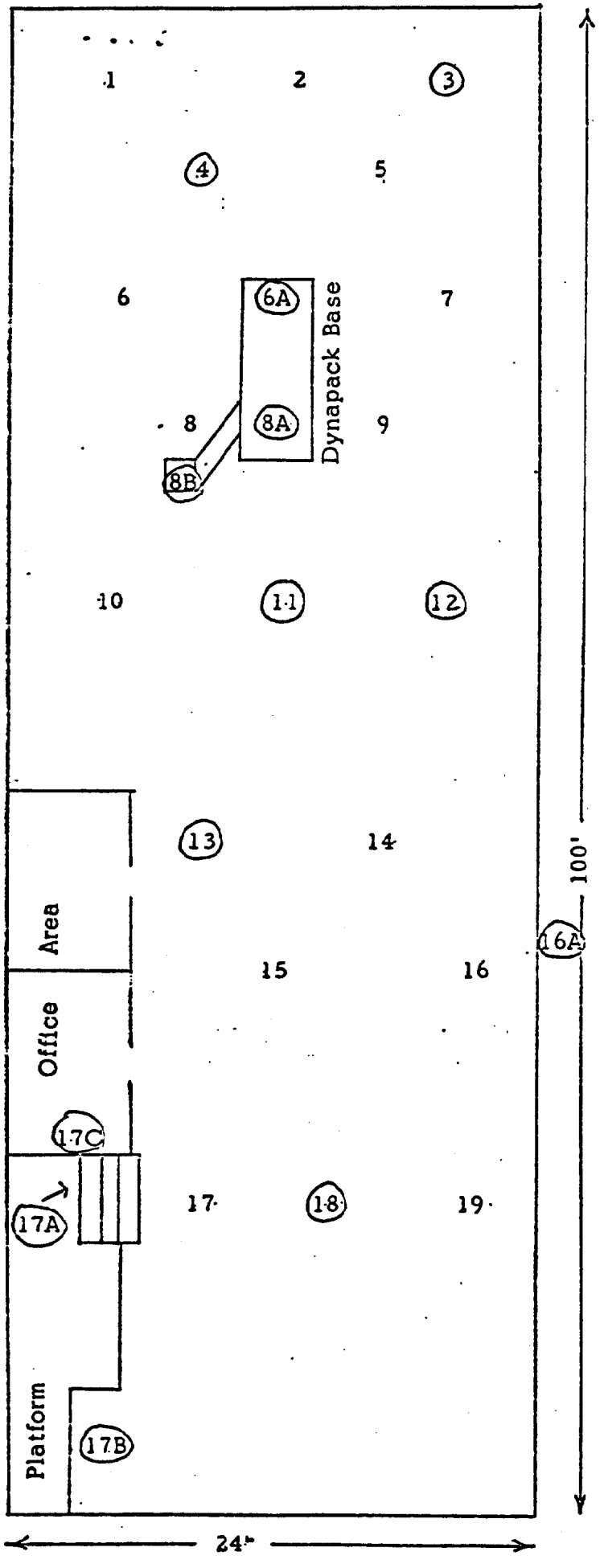


Location	Contact Reading α c/m/60cm²	Contact Reading β-γ mrad/hr	Smear α d/m/100cm²
4	300	.04	-
5	200	.06	50
8A (Window Sill)	800	.05	-
11	200	.02	-
13	200	.04	30
16A (Window Sill)	200	.02	-
20	100	.04	-
22	300	.01	20

DYNAPACK AREA

Fig. 8

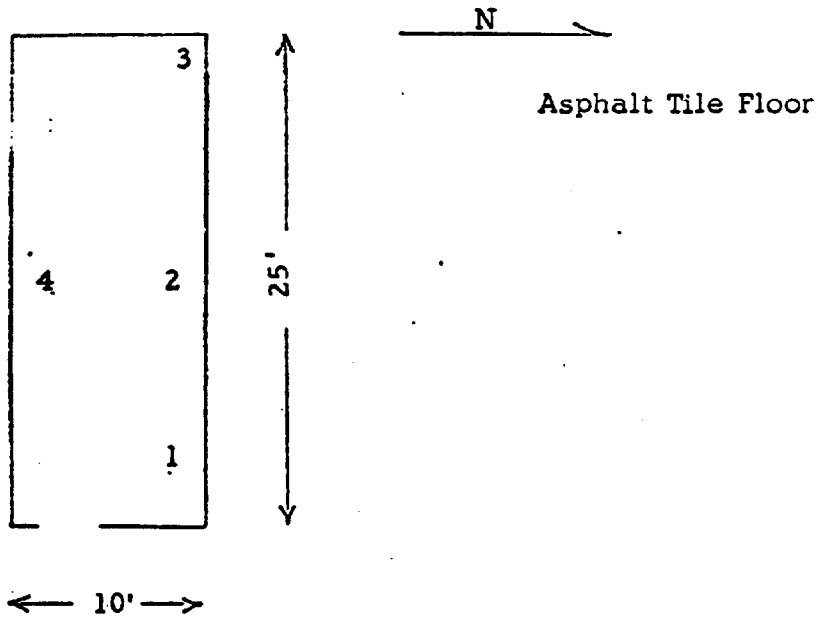
Painted Concrete Floor



Location	Contact Reading α c/m/60cm²	β-γ mrad/hr	α d/m/100cm²
3	100	.03	-
4	100	.01	20
6A (Base)	400	0.4	7
8A (Base)	200	.05	-
8B (Trench)	300	.07	-
11	100	.02	14
12	100	.03	-
13	250	.02	-
16A (Top Elect. Box)	250	.02	-
17A (Step)	350	.02	-
17B (Shelf)	400	.03	-
17C (Office Roof)	200	.03	-
18	200	.03	-

Fig. 9

LAB HOOD AREA



Location	Contact Reading α c/m/60cm^2	Contact Reading β-γ mrad/hr	Smear α d/m/100cm^2
1	300	.03	-
2	200	.03	3
3	150	.03	-
4	200	.02	-

HASL - October 1964