

U.S. NUCLEAR REGULATORY COMMISSION

REGION V

Report No. 30-11951/83-01

License No. 04-07316-02 Priority E Category IV

Licensee: Department of the Navy
Naval Energy and Environmental Support Activity
Naval Construction Battalion Center
Port Hueneme, California 93043

Facility Name: Same as above

Inspection at: The former Antarctic Rock Temporary Storage Area

Inspection conducted: January 18-19, 1983

Inspector: J. Frank Pang 4-6-83
J. Frank Pang, Radiation Specialist Date Signed

Approved by: R.D. Thomas 4/6/83
R.D. Thomas, Chief, Materials Radiation Date Signed
Protection Section

Approved by: J. E. Book 4/6/83
J. E. Book, Chief, Radiological Safety Date Signed
Branch

Summary:

Inspection of January 18-19, 1983 (Report No. 30-11951/83-01)

The licensee requested NRC to conduct a confirmatory survey of the Antarctic Rock Temporary Storage Area so that the area could be released for unrestricted use. On January 18-19, 1983, one Region V inspector conducted the confirmatory survey of the area. The survey consisted of the measurement of radiation exposure levels and the collection of soil, water and sediment samples for strontium-90 analyses.

Based upon the results of this survey, it was determined that the former Antarctic Rock Temporary Storage Area meets the release criteria for unrestricted use.

This survey involved a total of seven manhours on site utilizing one NRC inspector.

DETAILS

A. Persons Contacted

William Morris, Head, Technical Support Department, Port Hueneme, CA.
Troy R. Blanton, Physical Science Technician, Port Hueneme, CA.

B. Background

1. In correspondence to the NRC dated November 30, 1982, the licensee requested that permission be granted to release the former Antarctic Rock Storage Area located on the Naval Construction Battalion Center, Port Hueneme, California based upon the results of a release survey conducted by a consulting firm. The licensee had awarded a contract to "Controls for Environmental Pollution, Inc." in April, 1982, to conduct radiation surveys and to collect and analyze environmental samples at and in the vicinity of the temporary storage site. Based on the release criteria stipulated in Amendment No. 13 of the license, the licensee concluded that the release criteria had been met.
2. The release criteria given in Amendment No. 13 is as follows:
 - a. Maximum grid size is to be 25x25 ft.
 - b. Maximum gamma exposure rate in any grid from distributed source is not to exceed 10 micro-r per hour above background at one meter above ground level.
 - c. Maximum gamma exposure rate in any grid from discrete source is not to exceed 20 micro-r per hour above background at one meter above ground level.
 - d. Maximum dose commitment from Sr-90 is not to exceed 30 millirems per year to bone via ingestion pathway. Compliance with this criteria is met if Sr-90 concentration in soil is 5 picocuries per gram or less above background.
 - e. Sr-90 concentration in soil may be averaged through a depth of 15 cm.
 - f. Soil samples from any combination of 4 adjacent grids may be mixed for analysis. Adjacency criterion is met if continuous pathway exists from one grid to next.

C. Procedure

1. Survey and sampling locations.

The grid reference system established by the licensee in conducting its release survey was also used as a frame of

reference for conducting this survey (Figure 1). The former storage site and adjacent areas within the burn pit are designated by a total of 136 grids, each 25'x25' square. The grid reference system was re-established using a 100 ft. steel measuring tape and marking off reference points along the northern, southern and eastern edges of the former storage area at 50 ft. intervals with bamboo stakes and colored paper. One color was used to designate 50 ft. distances and another color to designate 100 ft. distances.

Points A and B in Figure 2 indicate the locations outside of this grid reference system where background measurements were made and samples collected.

Sample Grid C in Figure 1 is the location where the drainage pipe from the burn pit discharges into the Lehman Canal. At the time of the inspection, the water in the canal appeared to be stagnant and fetid.

2. Radiation Survey

a. Field instrument used.

The Eberline PRM-7 micro-r meter, Serial No. 453, due for calibration on March 22, 1983, was used to measure the exposure rates. All measurements were made at a distance of one meter above ground level.

b. Method of measurement

1. Background

Five measurements of the radiation background exposure rate were made within 100 ft. of Point A, Figure 1, and four background measurements were made within 30 ft. of Point B.

2. Antarctic Rock Temporary Storage Area measurements were made by averaging the readings while slowly traversing along the north-south centerline of each grid. Certain grids which exhibited higher exposure rates were surveyed in detail.

3. Sample Collection

a. Background

One sample from each point was collected from Points A and B to a depth of approximately 5 cm using a garden trowel. The hardness of the ground precluded digging to a greater depth.

b. Soil

14 grids were randomly chosen from the total of 136 grids. Soil samples were collected from approximately the center of each grid in the same manner as for the background samples. An additional soil sample was also collected from the grid found to have the highest radiation level.

c. Water and Sediment

One water and one sediment sample were collected from sample Grid C near the point where the drain pipe from the burn pit discharges into the Lehman Canal.

d. Analyses

The environmental samples collected were submitted on January 21, 1983 to the U. S. Department of Energy's Radiological and Environmental Sciences Laboratory at Idaho Falls, Idaho for strontium-90 analyses. The results of the analyses were received on March 14, 1983.

D. Results

1. Radiation Survey

a. Background

Background radiation exposure rates are given in Table 1. The exposure rate of 8 μ r/hr obtained at Point B was selected as being representative of the background since the soil in the burn pit would probably be more characteristic of the survey area.

b. Antarctic Temporary Rock Storage Area

Of the 136 grids established for the storage site and adjacent areas, radiation exposure rate measurements were made in 118 grids as indicated in Table 2 and Figure 3. Measurements were not made in seven grids located on top of the earth berm at the south end of the burn pit (Row 19S). Measurements were not made in the remaining 11 grids which were located in the areas adjacent to the storage area because these areas were covered by mounds of trash.

The radiation levels corrected for background are given in Table 3 and Figure 4.

Of the 118 grids where radiation exposure rates were measured, 18 grids had exposure rates above background. (All subsequent references to exposure rates will be to exposure rates corrected for background.) The maximum exposure rate found was 7 $\mu\text{r/hr}$ which occurred in one discrete location in Grid 12S5W. The exposure rate in the other locations within this grid was 5 $\mu\text{r/hr}$. Of the 17 remaining grids; three grids had exposure rates of 5, 4, and 3 $\mu\text{r/hr}$ respectively, three grids had exposure rates of 2 $\mu\text{r/hr}$, and 11 grids had exposure rates of 1 $\mu\text{r/hr}$ above background.

c. Sample Grid C

The exposure rate measured over water at the burn pit drainage discharge area was 6 $\mu\text{r/hr}$ which was slightly less than the 8 $\mu\text{r/hr}$ background in the burn pit.

2. Strontium-90 in Soil, Water, and Sediment

The results of all strontium-90 analyses are given in Table 4 and Figure 5 and are reported as "Results $\pm 1\sigma$ ". Small negative and other results $< 2\sigma$ are interpreted as including "zero" or as "not detected".

a. Background Values

The concentrations of strontium-90 in soil at Points A and B were 0.05 ± 0.04 and 0.03 ± 0.04 pCi/g respectively. The value of 0.03 ± 0.04 pCi/g was selected as being representative of the background value for the burn pit.

b. Soil Values

Of the 15 grids from which soil samples were collected, only 4 grids had strontium-90 concentrations above background. The maximum strontium-90 concentration was 0.69 ± 0.07 pCi/g in Grid 12S5W. The remaining three grids had strontium-90 concentrations of 0.2 pCi/g or less.

c. Sediment and Water Values

The strontium-90 concentration in the sediment and water samples collected from sample Grid C were 0.01 ± 0.05 pCi/g and $(1.4 \pm 2.4) \times 10^{-9}$ $\mu\text{Ci/ml}$.

E. Conclusion

The radiation exposure rates and strontium-90 concentrations in soil for the Antarctic Rock Temporary Storage Area found during this inspection were all below the release criteria as given in section B.2 of this report. A sediment and a water sample collected in the Lehman Canal near the drainage pipe from the burn pit

indicated the absence of strontium-90 at this location. As a result of this survey, it is concluded that the Antarctic Rock Temporary Storage Area may be released for unrestricted use.

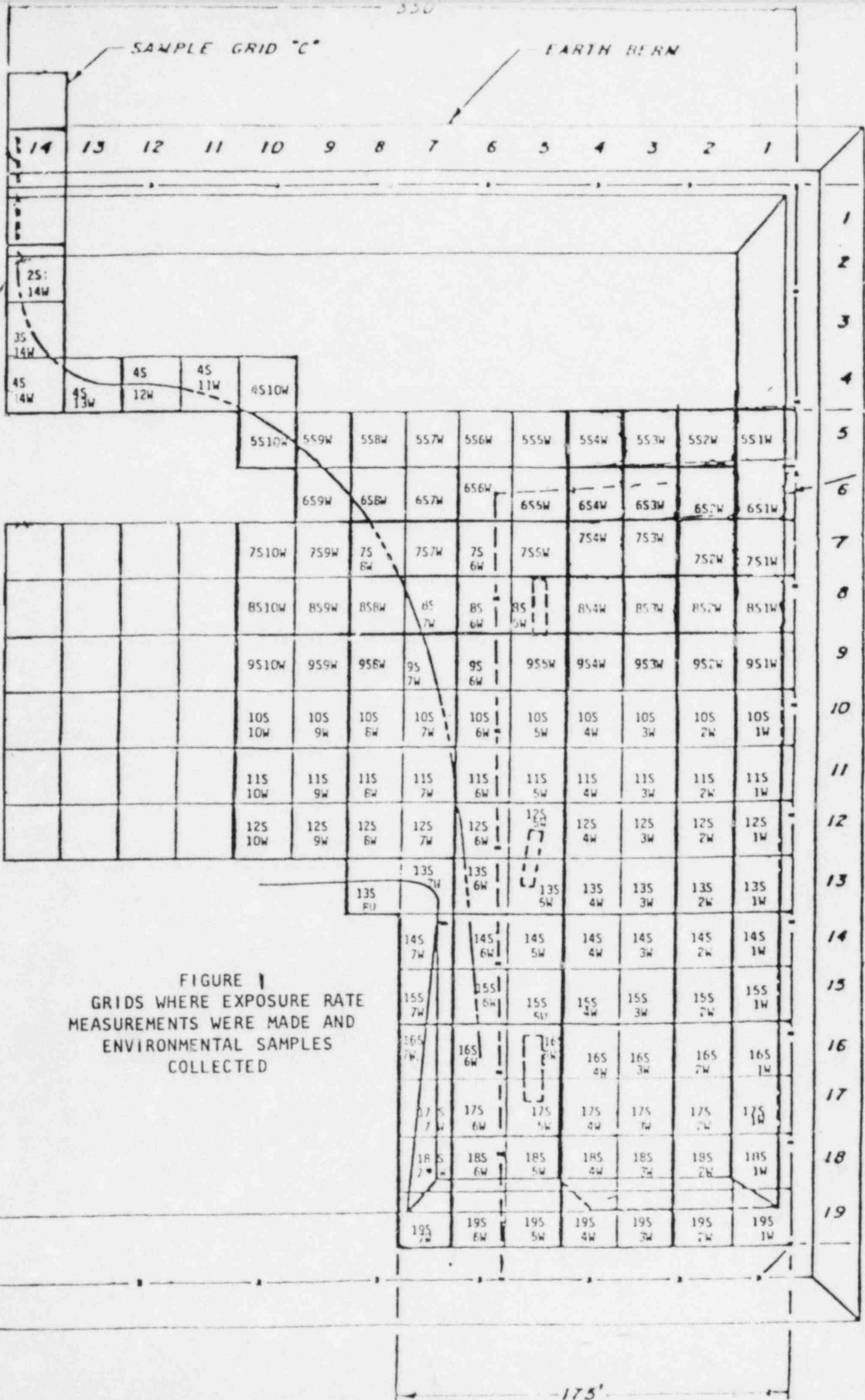


FIGURE 1
GRIDS WHERE EXPOSURE RATE
MEASUREMENTS WERE MADE AND
ENVIRONMENTAL SAMPLES
COLLECTED

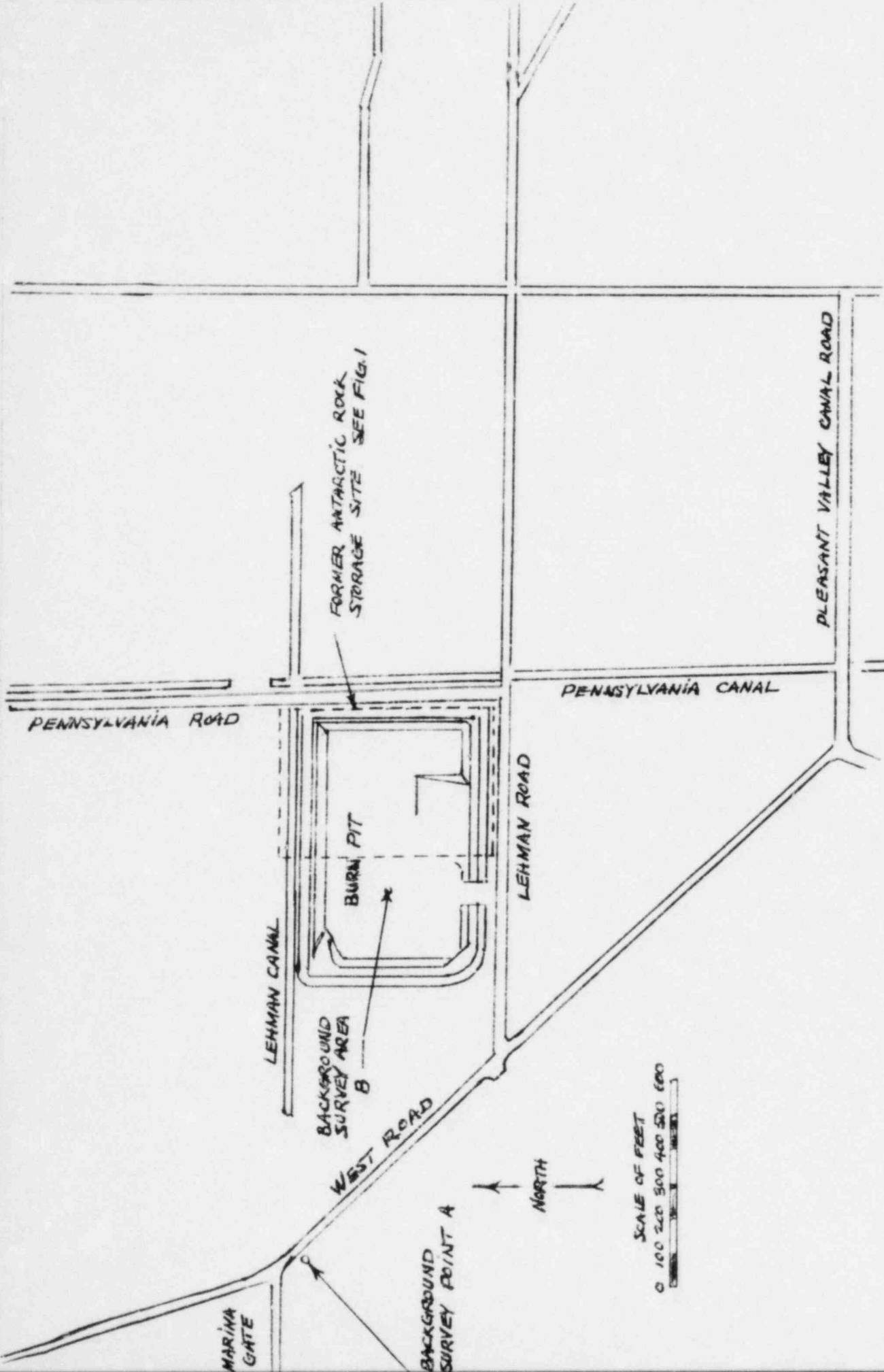


FIGURE 2
 SITE RELEASE SURVEY OF ANTARCTIC ROCK TEMPORARY STORAGE SITE

TABLE 1

Background Radiation and Sr-90 Measurements

<u>Location</u>	<u>μr/hr</u>	Strontium-90 <u>pCi/gm (1)</u>
Point A - West Marina Gate and Lehman Road		0.05±0.04
4 measurements were made 100 ft within the general location on the South side of the inter- section	9.5 9 8.5 <u>8.5</u>	
	Avg. 9	
Point B - Burn Pit		
At a point approx. 275 ft straight in from the entrance. Four measurements were made within a radius of 30 ft. at this point.	8 8 8 8	0.03±0.04
	Avg. 8	

(1) Result $\pm 1\sigma$.

TABLE 2

Radiation levels at one meter above ground level in the burn pit and above the water level in the Lehman Canal.

<u>Grid No.</u>	<u>Exposure Rate</u> <u>μr/hr</u>	<u>Grid No.</u>	<u>Exposure Rate</u> <u>μr/hr</u>
2S14W	8	8S1W	9
		8S2W	8
3S14W	8	8S3W	7
		8S4W	8
4S10W	8	8S5W	6
4S11W	8	8S6W	7
4S12W	7	8S7W	8
4S13W	7	8S8W	8
4S14W	8	8S9W	8
		8S10W	7
5S1W	8	9S1W	9
5S2W	8	9S2W	8
5S3W	8	9S3W	7
5S4W	8	9S4W	7
5S5W	8	9S5W	6
5S6W	8	9S6W	7
5S7W	8	9S7W	8
5S8W	7	9S8W	7
5S9W	7	9S9W	7
5S10W	7	9S10W	7
6S1W	8	10S1W	8
6S2W	8	10S2W	6
6S3W	8	10S3W	7
6S4W	7	10S4W	6
6S5W	6	10S5W	6
6S6W	6	10S6W	7
6S7W	7	10S7W	8
6S8W	7	10S8W	8
6S9W	8	10S9W	*
		10S10W	*
7S1W	8	11S1W	8
7S2W	8	11S2W	7
7S3W	8	11S3W	7
7S4W	8	11S4W	6
7S5W	6	11S5W	6
7S6W	7	11S6W	9
7S7W	7	11S7W	*
7S8W	8	11S8W	*
7S9W	8	11S9W	*
7S10W	7	11S10W	*

Table 2 (Continued)

<u>Grid No.</u>	<u>Exposure Rate</u> <u>μr/hr</u>	<u>Grid No.</u>	<u>Exposure Rate</u> <u>μr/hr</u>
12S1W	8	16S1W	10
12S2W	7	16S2W	9
12S3W	7	16S3W	10
12S4W	8	16S4W	12
12S5W	13	16S5W	7
	Spot 15	16S6W	9
12S6W	7	16S7W	9
12S7W	*		
12S8W	*		
12S9W	*		
12S10W	*		
13S1W	10	17S1W	7
13S2W	7	17S2W	9
13S3W	8	17S3W	9
13S4W	7	17S4W	12
13S5W	13	17S5W	6
13S6W	9	17S6W	8
13S7W	7	17S7W	8
13S8W	*		
14S1W	9	18S1W	7
14S2W	7	18S2W	8
14S3W	9	18S3W	11
14S4W	8	18S4W	10
14S5W	7	18S5W	7
14S6W	7	18S6W	8
14S7W	9	18S7W	8
15S1W	10	19S1W	**
15S2W	9	19S2W	**
15S3W	9	19S3W	**
15S4W	8	19S4W	**
15S5W	6	19S5W	**
15S6W	8	19S6W	**
15S7W	9	19S7W	**
		C	6

* Grid covered with trash. Measurements not made.

** Measurements not made.

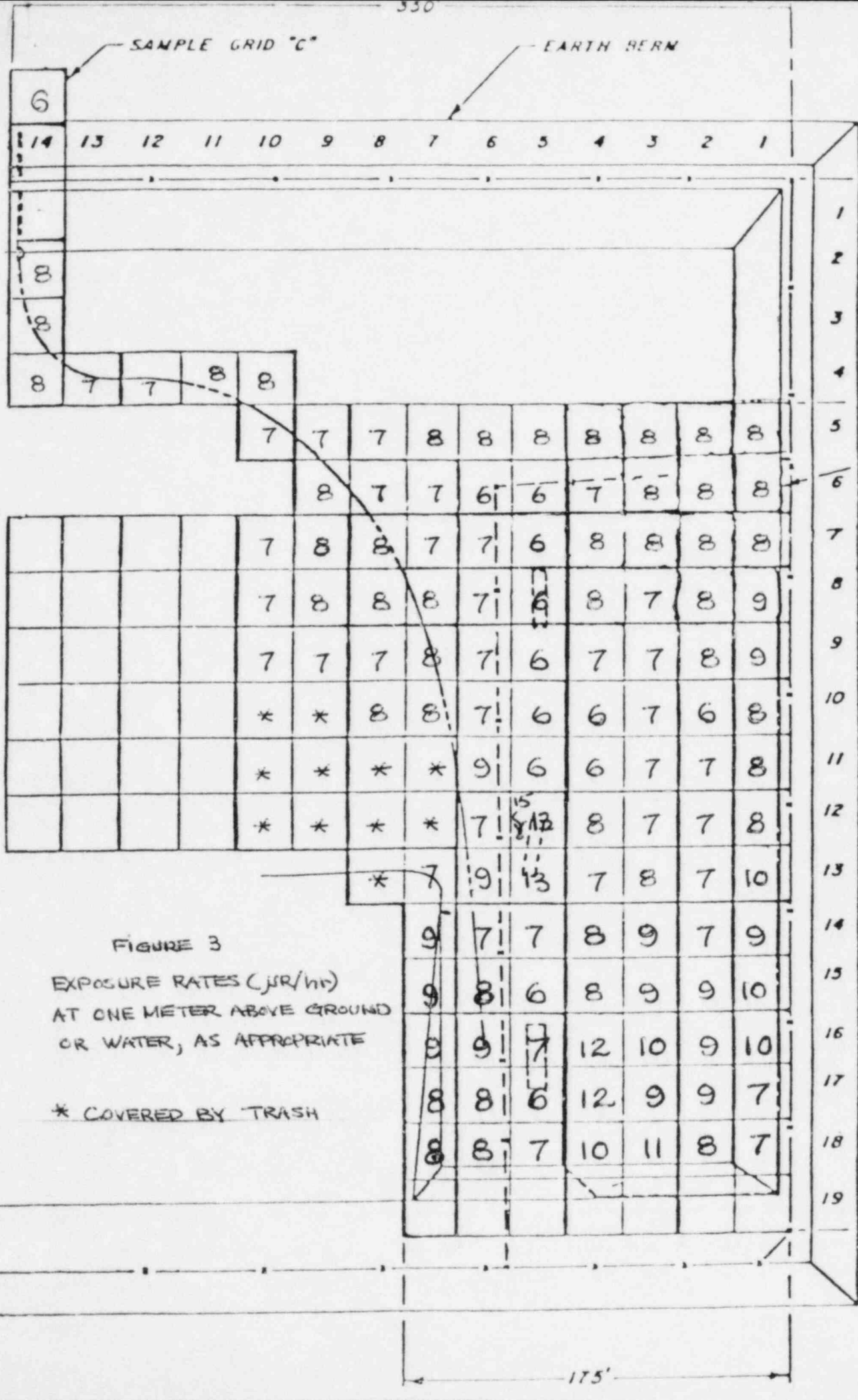


FIGURE 3
 EXPOSURE RATES (µR/hr)
 AT ONE METER ABOVE GROUND
 OR WATER, AS APPROPRIATE

* COVERED BY TRASH

TABLE 3

Exposure rates which were above background and their locations

<u>Grid No.</u>	<u>Exposure Rate Above Background μr/hr</u>
8S1W	1
9S1W	1
11S6W	1
12S5W	5
Spot	7
13S1W	2
13S5W	5
13S6W	1
14S1W	1
14S3W	1
14S7W	1
15S1W	2
15S2W	1
15S3W	1
15S7W	1
16S1W	2
16S2W	1
16S3W	2
16S4W	4
16S6W	1
16S7W	1

TABLE 4

Concentrations of strontium-90 in Soil, Water and Sediment

<u>Location</u>	<u>Type</u>	<u>pCi/gm (l)</u>
Point A - Intersection of West Ave and Marina Gate Road	Soil	0.05±0.04
Point B - Burn Pit - approx. 275 ft. from the entrance on a line to the entrance.	Soil	0.03±0.04
Grid 6S3W	Soil	0.08±0.04
6S7W	Soil	0.12±0.05*
8S1W	Soil	-0.02±0.04
8S5W	Soil	0.08±0.04
8S6W	Soil	0.02±0.05
9S4W	Soil	-0.02±0.03
9S7W	Soil	0.07±0.03
10S3W	Soil	0.04±0.03
14S2W	Soil	0.14±0.04*
14S7W	Soil	0.02±0.03
15S5W	Soil	0.07±0.04
16S3W	Soil	0.24±0.04*
16S4W	Soil	0.08±0.04
17S6W	Soil	0.00±0.04
12S5W	Soil	0.69±0.07*
Sample Grid C near burn pit drainage pipe	Sediment	.01±.05
Sample Grid C	Water	(1.4±2.4)E-9 µCi/ml

(1) Result $\pm 1\sigma$.

* Statistically significant above background.

SAMPLE GRID "C"

EARTH HERN

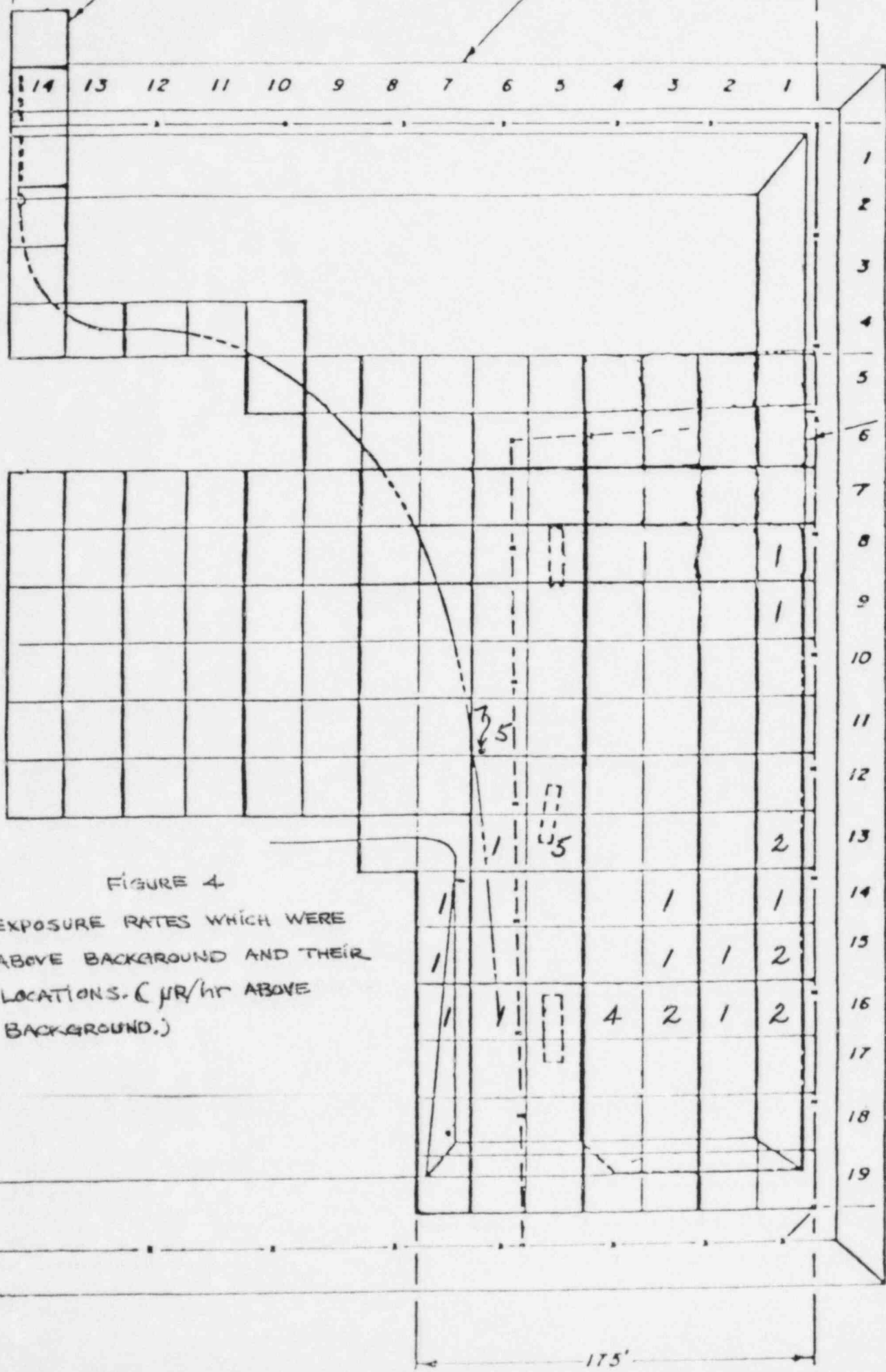


FIGURE 4
 EXPOSURE RATES WHICH WERE
 ABOVE BACKGROUND AND THEIR
 LOCATIONS. (μR/hr ABOVE
 BACKGROUND.)

175'

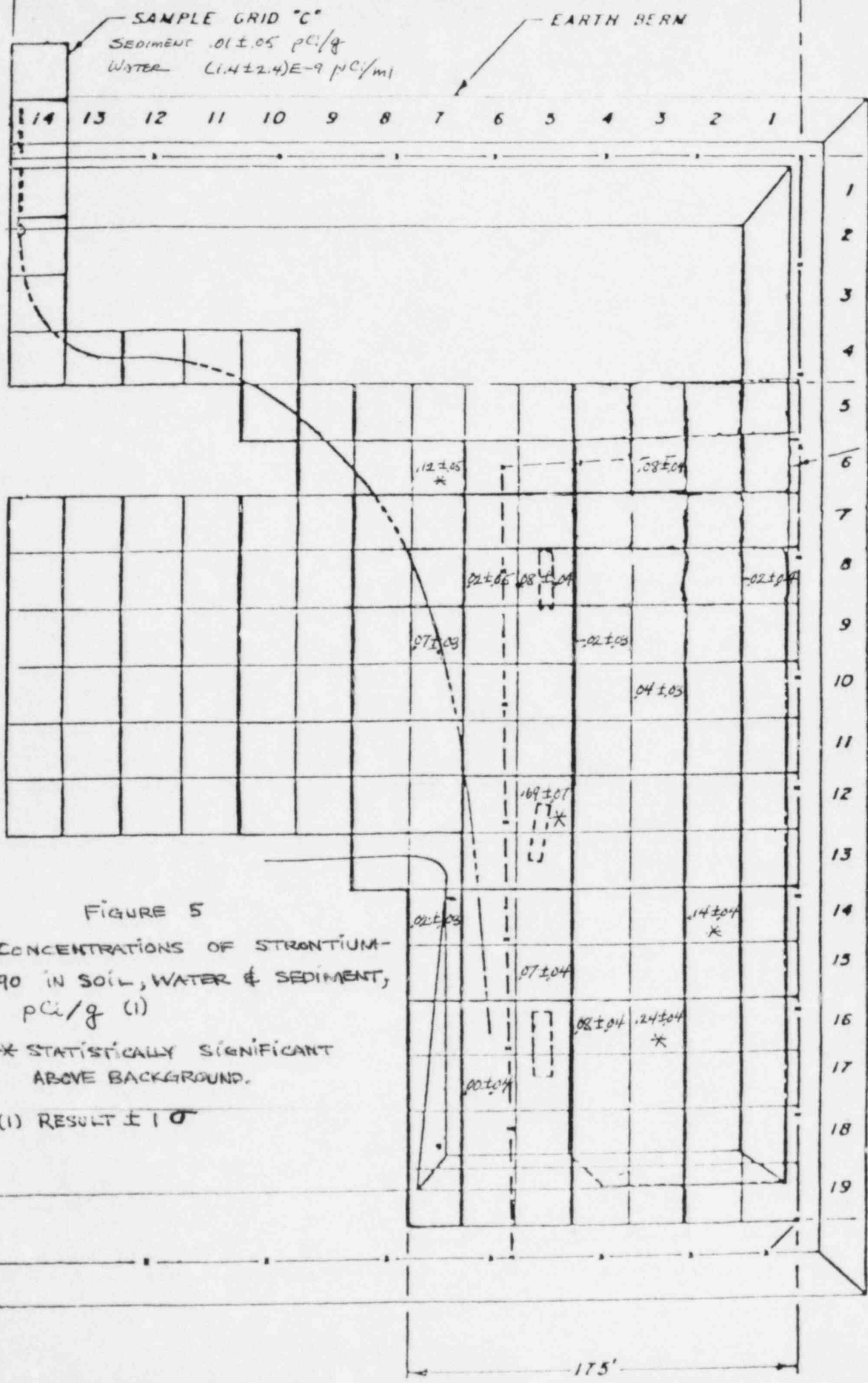


FIGURE 5
 CONCENTRATIONS OF STRONTIUM-90 IN SOIL, WATER & SEDIMENT, pCi/g (1)

* STATISTICALLY SIGNIFICANT ABOVE BACKGROUND.

(1) RESULT $\pm 1\sigma$