

SAVANNA, ILL

GENERAL SERVICES ADMINISTRATION

Region 5

230 S. Dearborn Street

Chicago, IL 60601



March 25, 1975

JFH

Lt. Col. James G. Frisbie
Savanna Army Depot
Savanna, IL 61074

Dear Sir:

Attached is a report submitted by Health Physics Associates Ltd. finalizing radioactive decontamination of GSA storage tank No. 905, formerly used to store Monazite, Rare Earth Material.

General Services Administration has declared this tank excess, since all of the Monazite has been shipped. The fixed radiation level has been determined to be at an acceptable level, therefore, the tank can now be used by your facility for storage of non-food items.

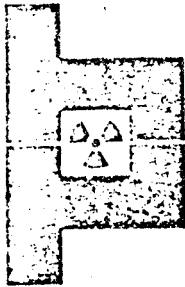
Please extend our sincere appreciation to Messrs. R. Hamling, Deputy Director DM&S and J. Barton, Safety Director, and other members of your staff who were very cooperative and helpful during the outloading of the Monazite and decontamination of the tank.

Sincerely,

Charles D. Beeler

CHARLES D. BEELER
Director, Property Management Division
Federal Supply Service

Enclosure



HEALTH PHYSICS ASSOCIATES LTD. CONSULTANTS IN RADIATION SAFETY

2356 SKOKIE VALLEY ROAD / HIGHLAND PARK, ILL. / PHONE: AREA (312) 433-3333

REPORT OF

RADIATION DECONTAMINATION PROGRAM

REPORT PREPARED FOR:

General Services Administration
Federal Supply Service
230 S. Dearborn Street - 33rd Floor
Chicago, Illinois 60604
Attention: Mr. John Trunda

DECONTAMINATION PERFORMED AT:

Savanna Army Depot
Savanna, Illinois
Storage Tank #905

ITEM DECONTAMINATED:

Empty storage tank #905, formerly used to store
about 110 tons of monazite sand (5.5% ThO_2).

DATES OF DECONTAMINATION:

September 25, 26, 1974

SURVEY EQUIPMENT USED:

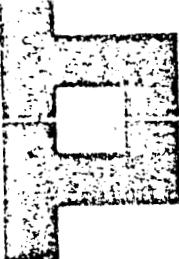
Alpha surveys were made with an Eberline PAC3G
calibrated with a Pu-239 standard.

Beta surveys were made with a Ludlum Model 3GM.
A Gamma approximation was made with a Ra-226
standard.

Gamma surveys were made with a Victoreen 440 or
Eberline GM survey meters.

PERSONNEL:

Donald Sreniawski of Health Physics Associates Ltd.
Harry Szepanski of General Services Administration



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DECONTAMINATION PROCEDURE:

A trench was dug at the entrance to the tank, 3' wide, 4' long, and 2' deep, to collect the water used to hose the tank interior. Since ThO_2 is insoluble in water (see Reference *), the trench was used to collect flushed water. When drained, all residue plus 6" of soil as active waste were removed. Any Thoron with daughters that had been carried in the water would have decayed with a half-life of 10.6 hours or less to stable Lead-208.

Persons who entered the tank wore protective clothing, shoe covers, gloves and half-face respirators. Portions of the walls were scraped to remove sand held by paint, rust spots on the floor and walls were scraped, the floor was swept and then vacuumed to remove the scraped material and monazite sand.

An air sample was taken inside the tank during the scraping operation. The walls, ceiling and floor were hosed with 500 gallons of water at high pressure from a depot fire truck and the water drained into the trench. Excess water was vacuumed. Surveys were taken of the fire hose, tools, and personnel. The residue at the bottom of the trench plus surrounding 6" of soil were removed by shovel into boxes which were transferred to 55-gallon steel drums as active waste.

*Reference

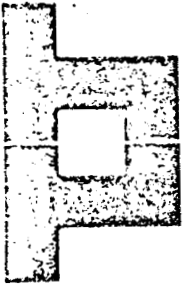
Albert, R.E., "Thorium - Its Industrial Hygiene Aspects," Page 8, Section 2.3, Academic Press, 1966.

RADIATION SURVEYS:

Table I

Pre-decontamination Survey
Figure 1.

<u>Area Surveyed</u>	<u>Maximum Levels Detected</u>		
	Counts per minute per 100 sq. cm.		
	Alpha	Beta	Gamma (mR/hr)
Tank Floor	32,780	37,500	0.6
Walls	16,000	26,000	0.4
Ground	18,000	12,500	0.2



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Table II

Air Sample During Decontamination
Sample Collected
 3.4×10^8 cc 1.23×10^{-14} uCi/cc

Table III

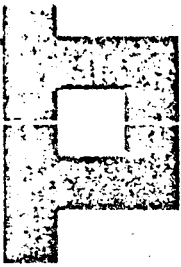
Post Decontamination Survey (Total)

<u>Area Surveyed</u>	Maximum Levels Detected		
	Counts per minute per 100 sq. cm.		
	Alpha	Beta	Gamma (mR/hr)
Tank Floor (Fig. 2,4)	983	7500	0.1
Tank Walls (Fig. 3,5)	328	6250	0.1
Ground Level (Fig. 2)	328	3125	0.07

Table IV

Post Decontamination Survey (Removable)

No.	Area Surveyed (Fig. 6)	Alpha Levels in dpm/100 cm ²	
1	Floor	491 ±	13
2	Post	72 ±	5
3	Wall	204 ±	8
4	Floor	241 ±	9
5	Wall	115 ±	7
6	Floor	78 ±	6
7	Wall	157 ±	8
8	Floor	410 ±	12
9	Floor	678 ±	15
10	Floor	573 ±	14
11	Floor	254 ±	9
12	Wall	144 ±	7
13	Floor	370 ±	11
14	Wall	327 ±	11
15	Floor	344 ±	11
16	Wall	242 ±	9
17	Floor	810 ±	16



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Table V

Soil Sample Analysis
(Figure 7)

<u>Location of Sample</u>	<u>Level of Contamination</u> pCi/gm
1. At entrance before decontamination	120 ± 14
2. At entrance after decontamination	27 ± 4
3. Contaminated ground area	•3460 ±139
4. Clean ground area	13 ± 2

Table VI

Personnel and Equipment Survey

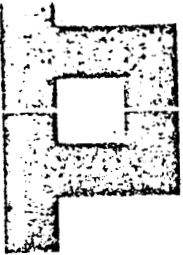
	Alpha cpm/100 cm ²	Beta cpm/100 cm ²
Harry Szepanski	< 100	< 100
Donald Sreniawski	< 100	< 100
Fire hose	< 100	< 100
Tools and Equipment	< 100	< 100

Table VII

Personnel Exposure

	Dosimetry	Film Badge
Harry Szepanski	< 5 mR	M *
Donald Sreniawski	< 5 mR	M

*M = < 10 mR



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CONCLUSIONS:

Surveys were taken with 4 mg/cm^2 window for beta levels and $<1 \text{ mg/cm}^2$ window for alpha levels. All cpm reading should be multiplied by 2 for 4pi dpm levels.

All areas surveyed at termination of decontamination are less than "diminimous levels" as stipulated by the AEC for release to restrictive public use. Restrictive may be defined as for other than storage and/or preparation of food, cosmetics or similar products.

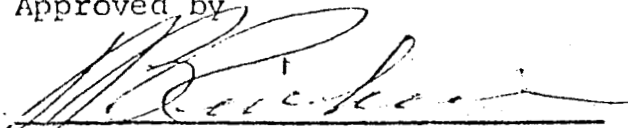
Respectfully submitted,

HEALTH PHYSICS ASSOCIATES LTD.



Donald H. Sreniawski
Health Physicist

Approved by



W.B. Rivkin
Vice President

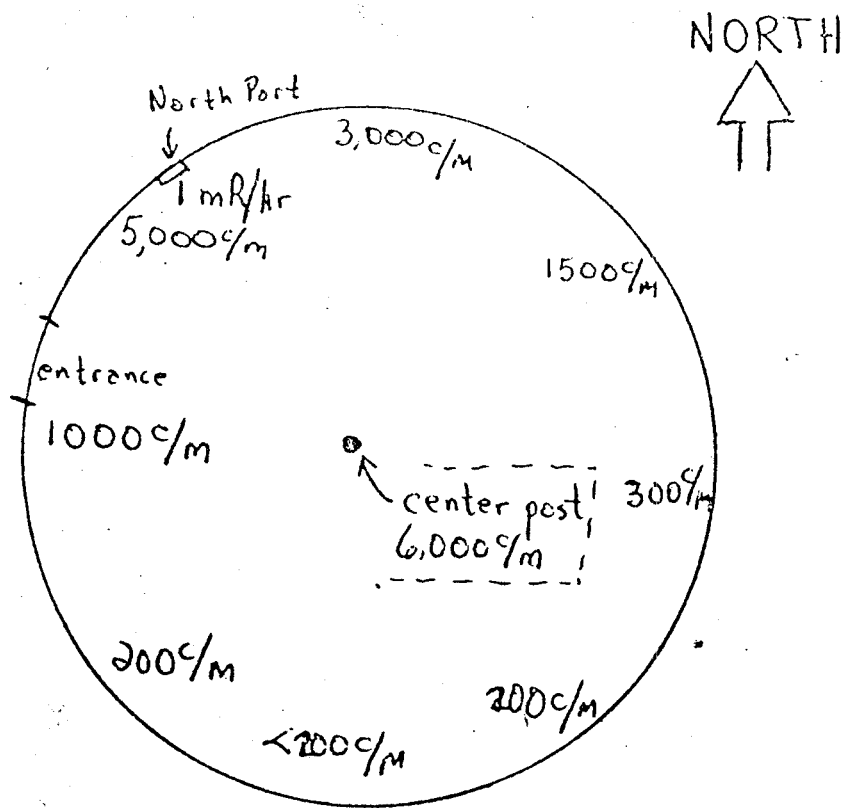


FIGURE 1. β survey of tank floor

for conversion of β to γ data use table 1 (below)

Table 1. Calibration of Ludlum Model 3 GM w/R₂220

mR/hr	c/m
0.055	500
0.1	1,100
0.2	2,000
0.5	5,000
1.0	10,000

FIGURE 1WU - (1) SURVEY OF FLOOR & GROUND

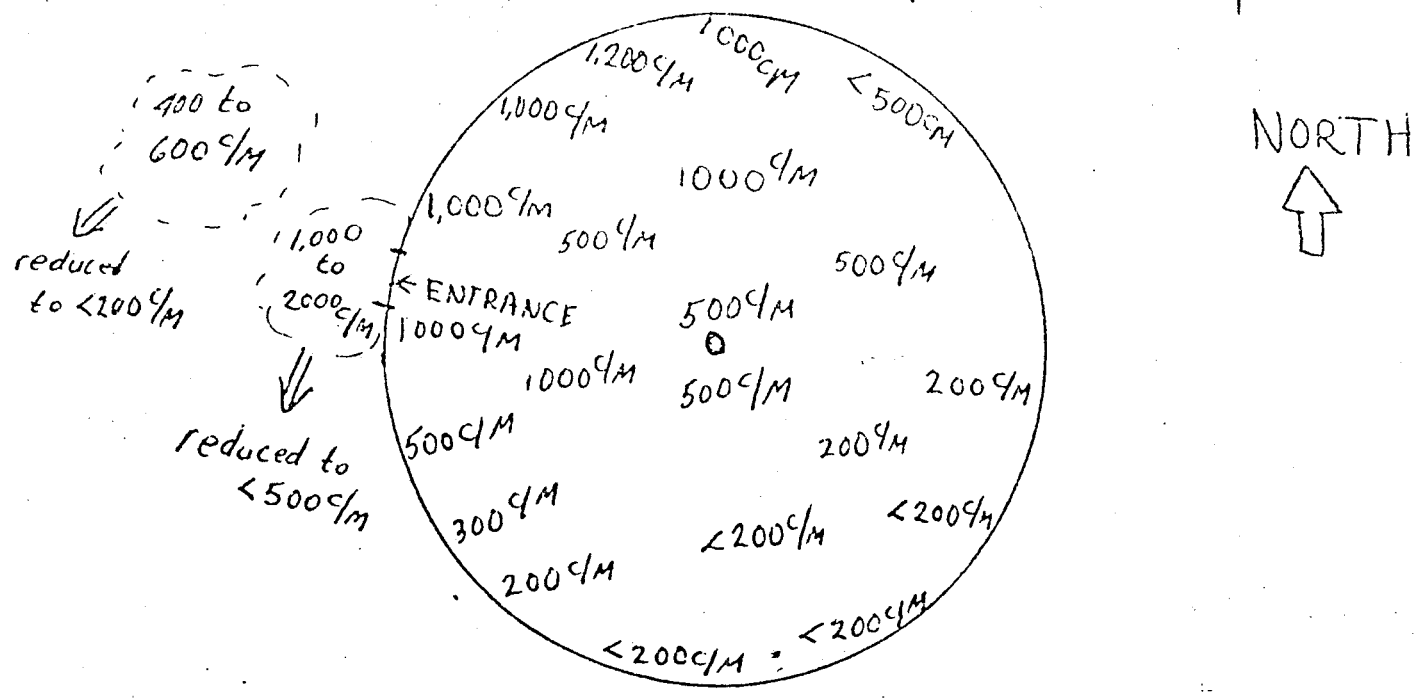


FIGURE THREE - (B) SURVEY OF WALLS

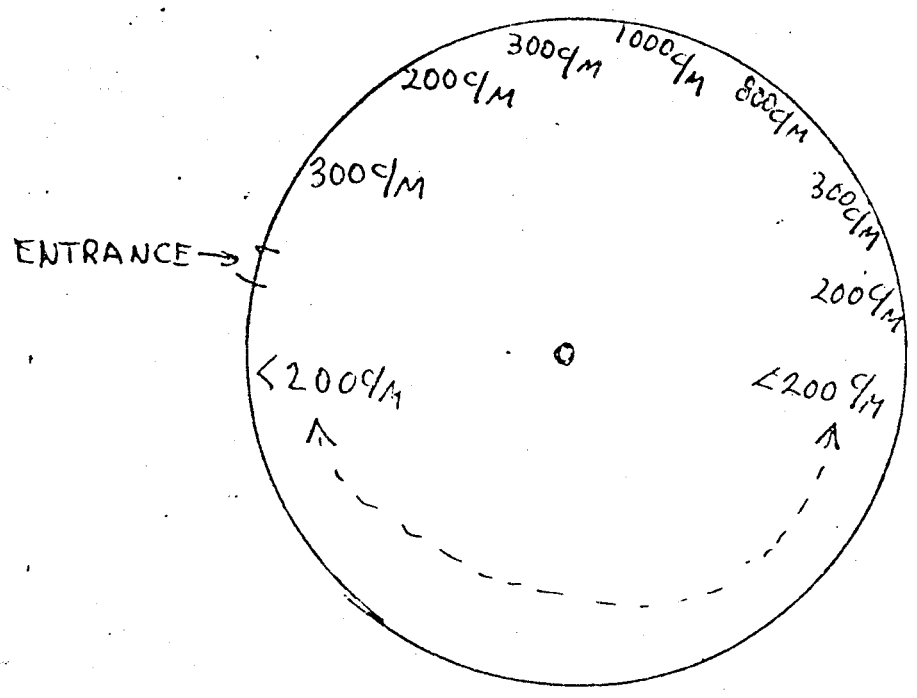


FIGURE FOUR - SURVEY OF FLOOR

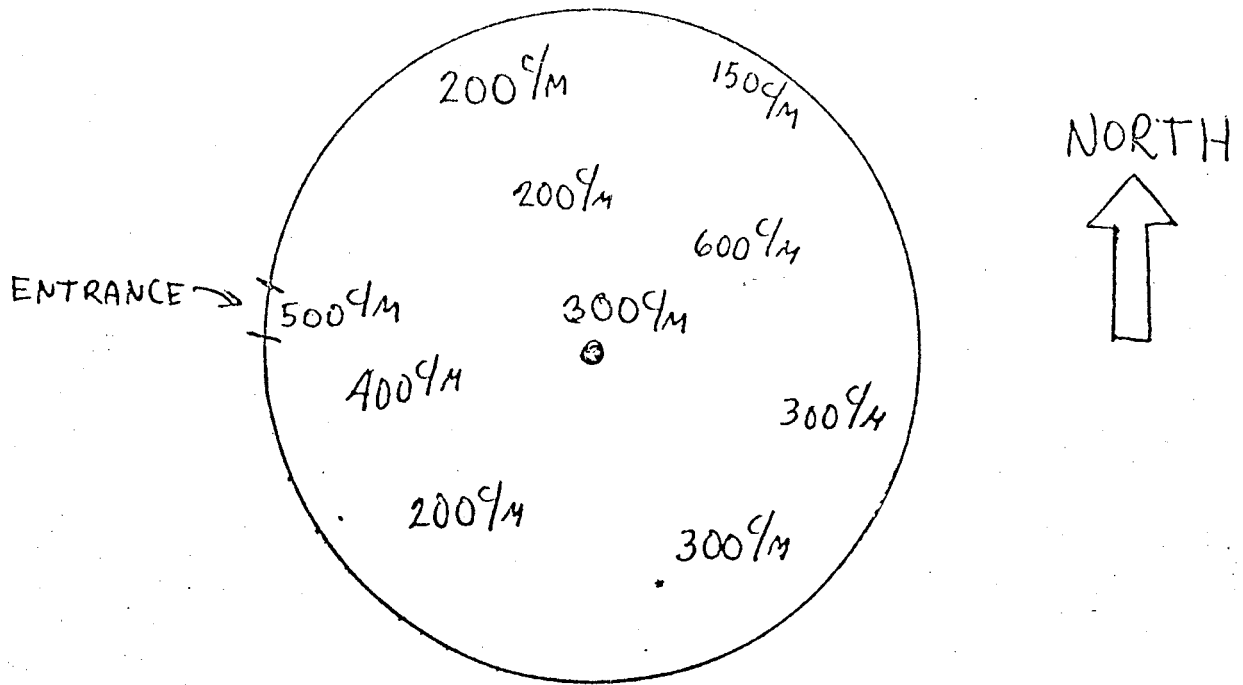


FIGURE FIVE - SURVEY OF WALLS

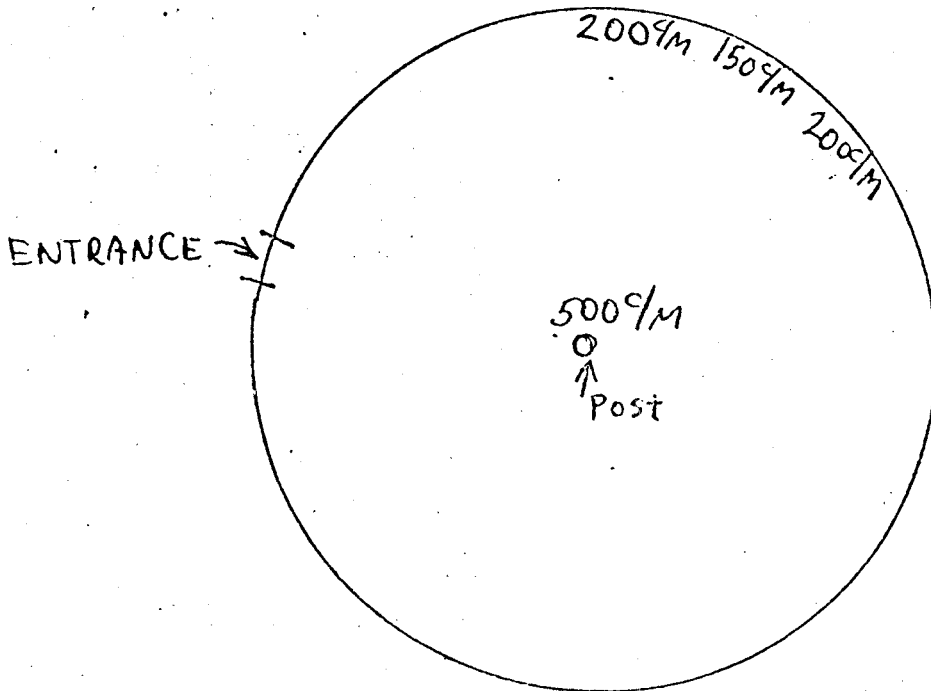
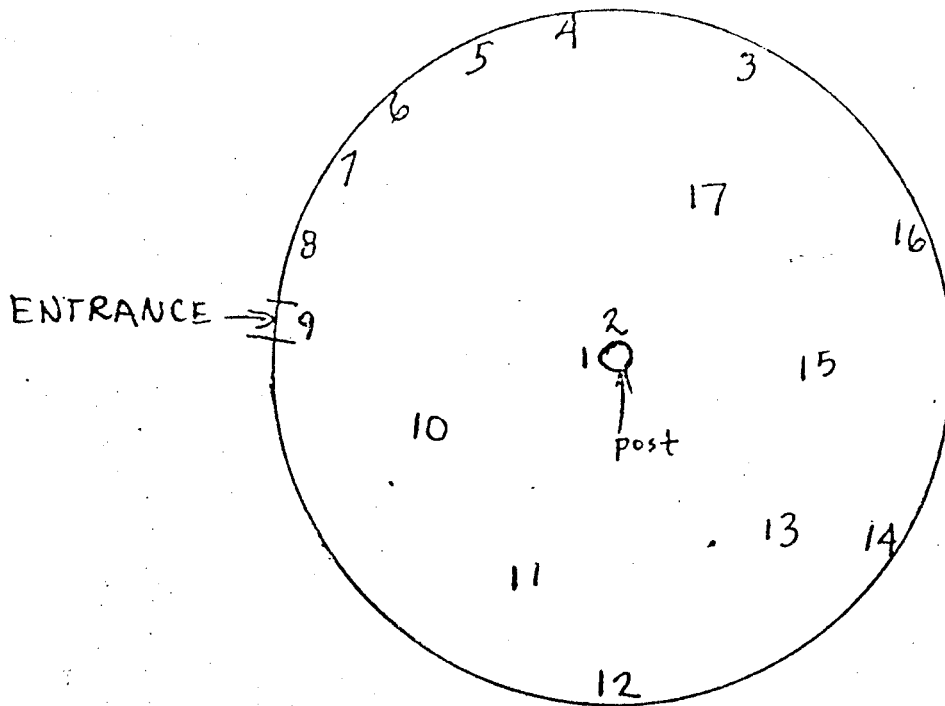


FIGURE SIX - SMEAR LOCATIONS

EACH SMEAR $\approx 300 \text{ CM}^2$



1) Floor -

2) Post -

3) wall -

4) floor -

5) wall -

6) floor -

7) wall -

8) floor -

9) floor -

10) floor -

11) floor -

12) wall -

13) floor -

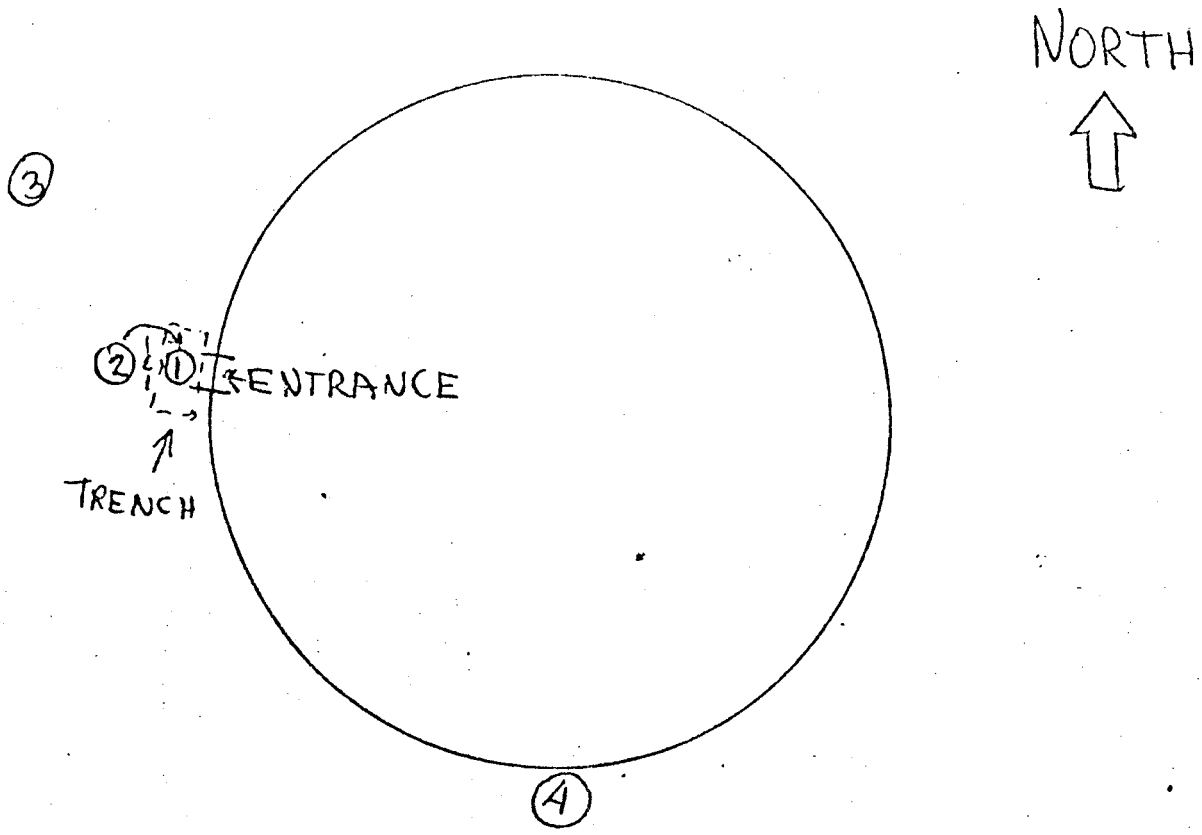
14) wall -

15) floor -

16) wall -

17) floor -

FIGURE SEVEN - SOIL SAMPLES



- ① SOIL SAMPLE BEFORE DECONTAMINATION.
- ② " " " AFTER " "

These two sample ① & ② were taken in open trench.

- ③ CONTAMINATED GROUND AREA ,
- ④ " CLEAN " " "