

MARSHALL ISLANDS FILE TRACKING DOCUMENT

Record Number: 44

\* File Name (TITLE): Radioactive Debris from Op. Castle =  
Wakadwidu Island

Document Number (ID): 240-4601

DATE: 1/1955

Previous Location (FROM): NY Ops Object

AUTHOR: Dr Lyack

Additional Information: \_\_\_\_\_

\_\_\_\_\_

OrMIbox: 3

CyMIbox: 2

CONTAINS  
MI locations

35

NYO-4621-Del



# A Facsimile Report

Reproduced by  
**UNITED STATES  
 ATOMIC ENERGY COMMISSION**  
 Division of Technical Information  
 P.O. Box 62 Oak Ridge, Tennessee 37830



NYOO 4621

## WORLDWIDE FALLOUT FROM OPERATION CASTLE

### 1. Introduction

During Operation Castle, the atomic weapons tests held in the Spring of 1954 at the Eniwetok Proving Grounds, fallout monitoring was conducted by the A.E.C. Health and Safety Laboratory (New York Operations Office) and the same agencies which had cooperated in earlier surveys.

The work was done in these phases:

- a. Collection of fallout samples at fixed stations comprising a worldwide network and analysis of the samples at the Health and Safety Laboratory.
- b. Similar sampling and analysis of fallout on Navy ships in the Pacific.
- c. Assistance to the task force by the installation and maintenance of automatic radiation and airborne dust monitors on Pacific Islands, furnishing instruments for aerial monitoring of the islands and providing technical instruction and guidance in the operation of the aerial and ground instruments.
- d. Investigation of the feasibility of measuring fallout over the open sea.

This summary presents the results of fallout sampling at fixed stations. The work referred to in "c" and "d" above will be reported separately. The fixed station data in greater detail and an analysis of it in relation to meteorology will be reported by the Weather Bureau.

To simplify data handling, the ship samples were assumed to represent areas into which the ocean was divided for convenience and in which the ships happened to be when the samples were taken. The number of samples in each area varied from day to day and the number of days represented by samples was different for each area. For these reasons the ship data are not suitable for reporting in summary form. They are best studied in detail as a part of the general study being made by the Weather Bureau.

The ships were used in the sampling program to augment the fixed stations in case a specific question might require dense coverage in some area of the ocean.

### 2. Sampling

Observers at each typical fixed station collected 24 hour samples by exposing duplicate one foot squares of gummed film. One hundred twenty such stations throughout the world mailed samples daily to the Health and Safety Laboratory where the activity was measured. The program began February 1, 1954 and is still in effect as this is written, except that a few stations were closed only temporarily during the weapons tests have dropped out.

Sampling and analysis techniques were the same as those used during Operation Upshot-Knothole and other test series and they are described in earlier reports 1,2,3.

### 3. Results

The maps, Figures 1 to 19, show the total fallout of beta activity at the fixed stations for each of six periods, the five between consecutive explosions and the sixth beginning the day of the last explosion and ending 18 days later. Each period begins on the day of a burst. Figures 19 to 21 show the totals for all six periods. Fallout for June, July and August is shown in Figures 22 to 30.

The data are in millicuries per square mile extrapolated to January 1, 1954. For the purpose of extrapolation the activity was attributed to test explosions according to an arbitrary rule adopted in advance. Fallout at stations in the 900 series, the nearest to the proving grounds, and fallout on ships was attributed to the latest burst preceding sampling. Fallout at other stations was attributed to the burst before the latest date that all fallout between the first and second bursts was assumed to be the first. Beginning in August the activity was assumed to have originated on April 10th, about the midpoint of the series.

As usual the activity was assumed inversely proportional to the square power of the age.

Total world fallout, excluding the vicinity of the test site, from the beginning of the series until 18 days after the last burst, is about 4.4 megacuries.

In the vicinity of the tests the network was not dense enough to furnish an estimate of fallout. Measurements of radiation from the open ocean reported elsewhere, have demonstrated that activity of a higher order fallout over small spots of the ocean.

Estimated world fallout is 0.7 and 0.8 megacuries for June and July. The estimate for August is 1.2 megacuries, an increase of 50% over July. The average monthly fallout for the three months of the weapons tests was only slightly greater, 1.5 megacuries.



600	Edmonton, Alberta	701	Prestwick, Scotland
601	Deep River, Ontario	702	Rhein Main, Germany
602	Goose Bay, Labrador	703	Pretoria, South Africa
603	Stephenville, Newfoundland	704	Dakar, Fr. West Africa
604	Thule, Greenland	705	Dhahran, Saudi Arabia
605	Keflavik, Iceland	706	Sidi Slimane, Fr. Morocco
606	Shenya, Alaska	707	Beirut, Lebanon
607	Waduk, Alaska	708	Oslo, Norway
608	Nome, Alaska	709	Leopoldville, Belgian Congo
609	Fairbanks, Alaska	710	Wheelus A. F. B., Tripoli
610	Juneau, Alaska	711	Lagos, Nigeria
611	San Juan, P. R.	713	Durban, Natal, U. of S. Africa
612	Canal Zone	714	Monrovia, Liberia
613	Bermuda	717	Addis Ababa, Ethiopia
614	Lima, Peru	801	Hiroshima
615	San Jose, Costa Rica	802	Nagasaki
616	Lajes A. F. B., Azores	803	Hong Kong
617	Buenos Aires, Argentina	804	Tai Pei, Formosa
618	Sao Paulo, Brazil	805	Tokyo, Japan
619	Belem, Brazil	806	Misawa A. B., Japan
620	La Paz, Bolivia	807	Kadena, Okinawa
621	Quito, Ecuador	808	Bangkok, Siam
622	Mexico City	809	Bombay, India
623	Bogota, Columbia	810	Melbourne, Australia

811	Wellington, New Zealand	908	Wake
813	Columbo, Ceylon	909	Carson Island
814	Singapore	910	Ponape
815	Sydney, Australia	911	Truk
816	Calcutta, India	912	Yap
817	Noumea, New Caledonia	913	Koror
901	Guam	914	Lima
903	Iwo Jima	915	Honolulu, Hawaii
904	Clarke A. F. B., P. I.	916	Hilo, Hawaii
905	Johnston Island	920	Kunene
906	French Frigate Shoals	921	Majuro
907	Midway	922	Kwajalein





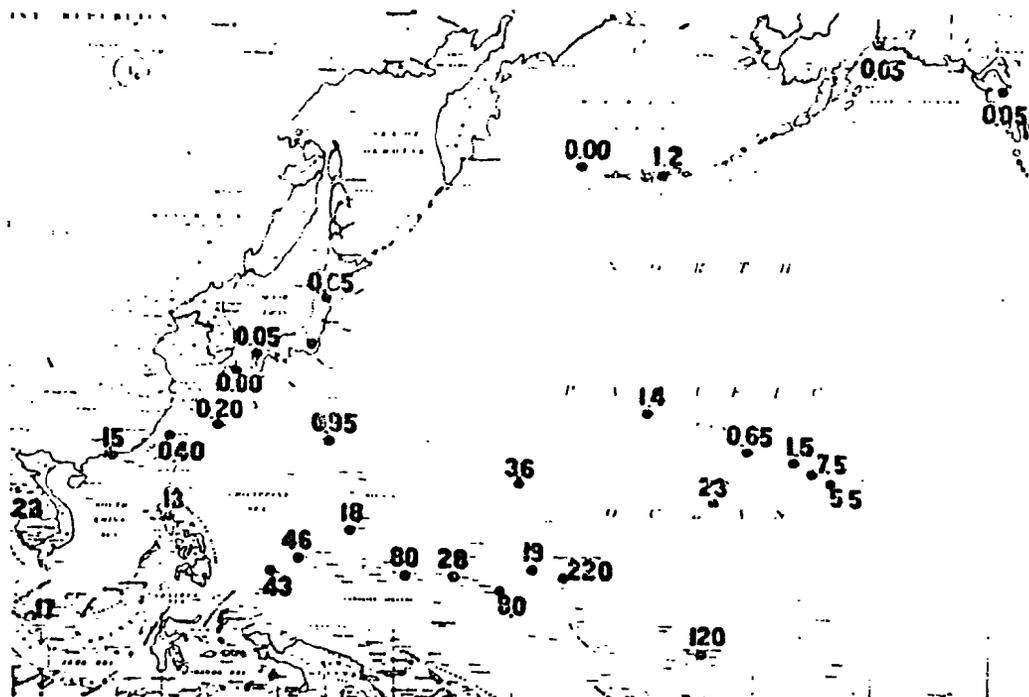


Fig. 3 - Radioactive Fallout, 2/28 - 3/25/54, Pacific  
 $\text{nc}/\text{mi}^2$ , extrapolated to 1/1/55

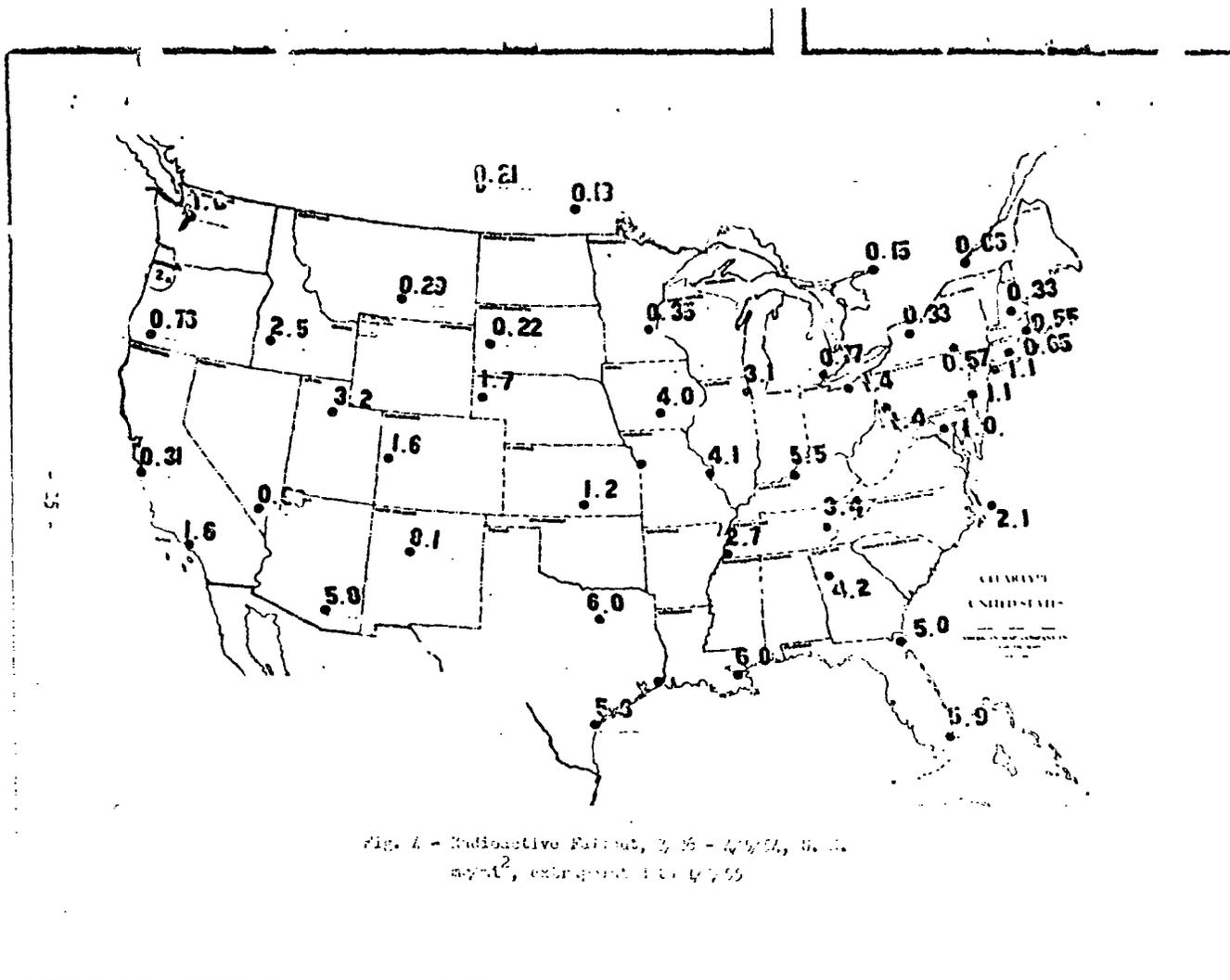
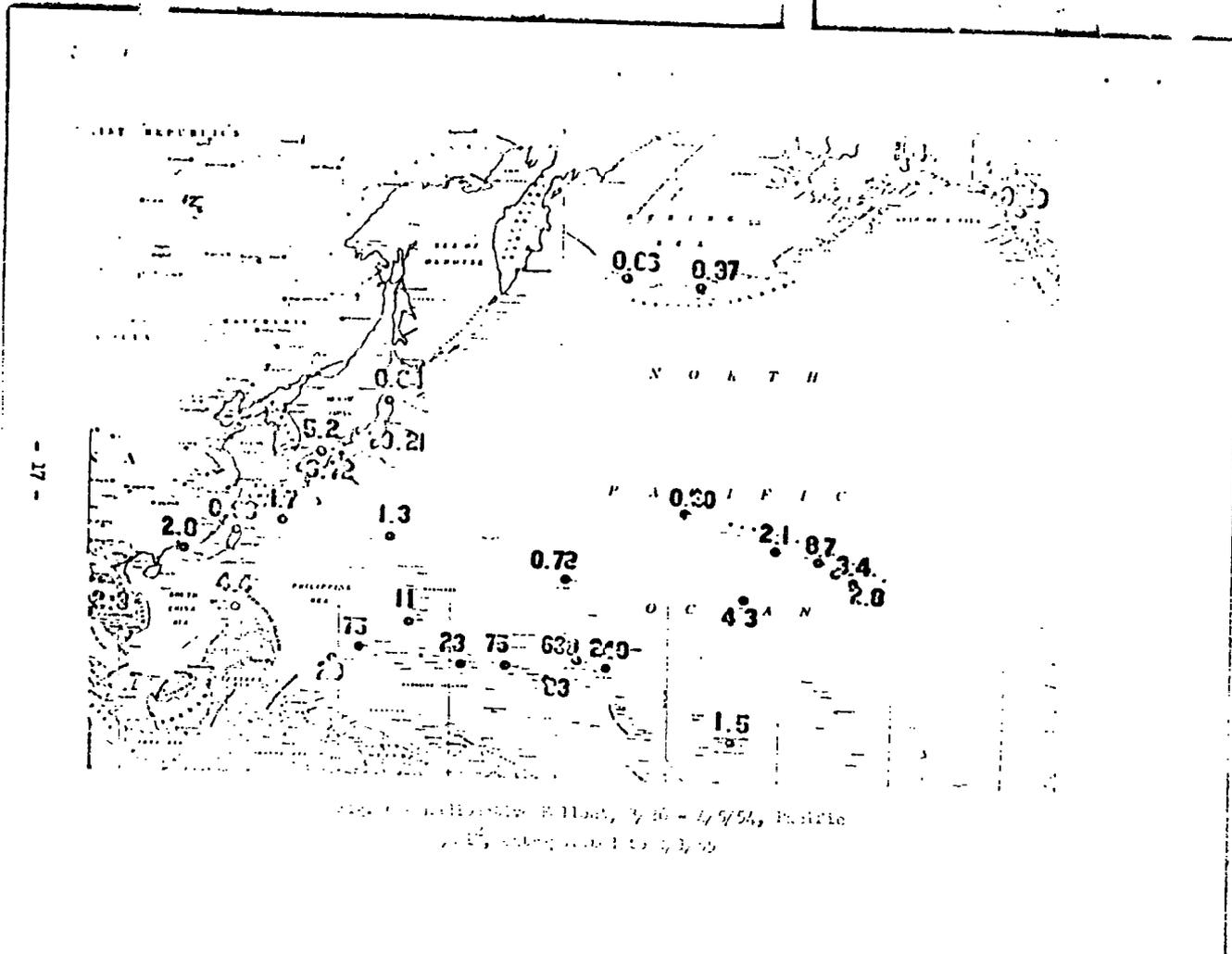


Fig. 4 - Radioactive Fallout, 1963 - 1965, U.S.  $\mu\text{mCi/m}^2$ , extrapolated to 1965





Map of the Pacific Ocean, 1954, Pacific  
 1954, 1955, 1956, 1957, 1958

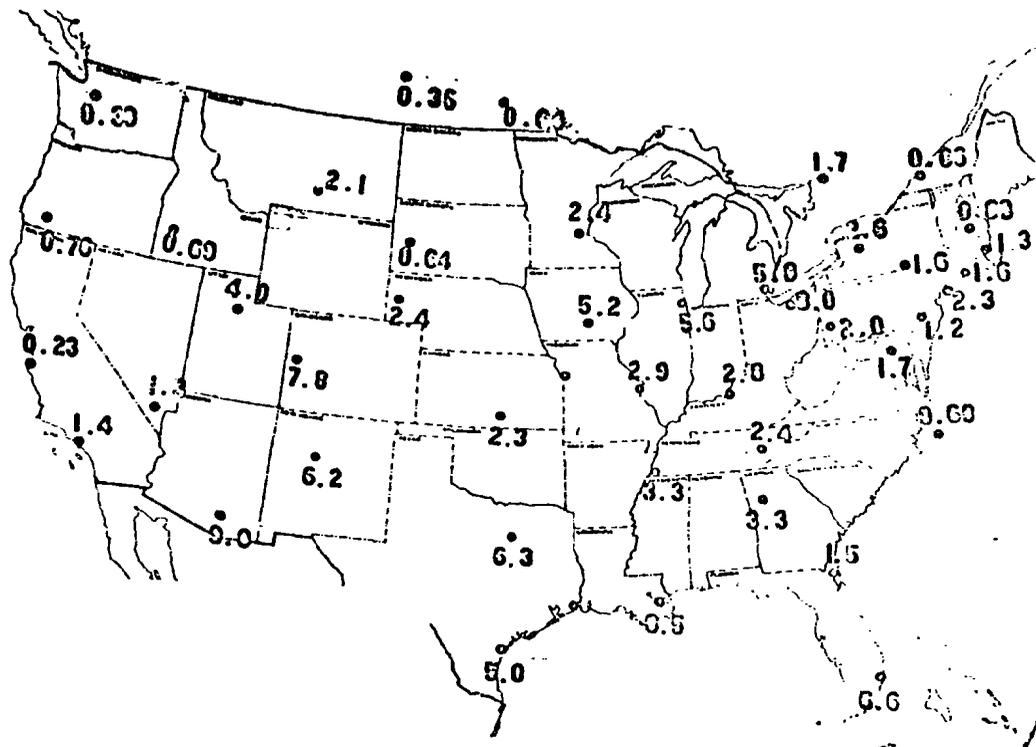


Fig. 7 - Radioactive Fallout, 1/6 - 1/21/67, U. S.  
nCi/ml, extrapolated to 1/1/67

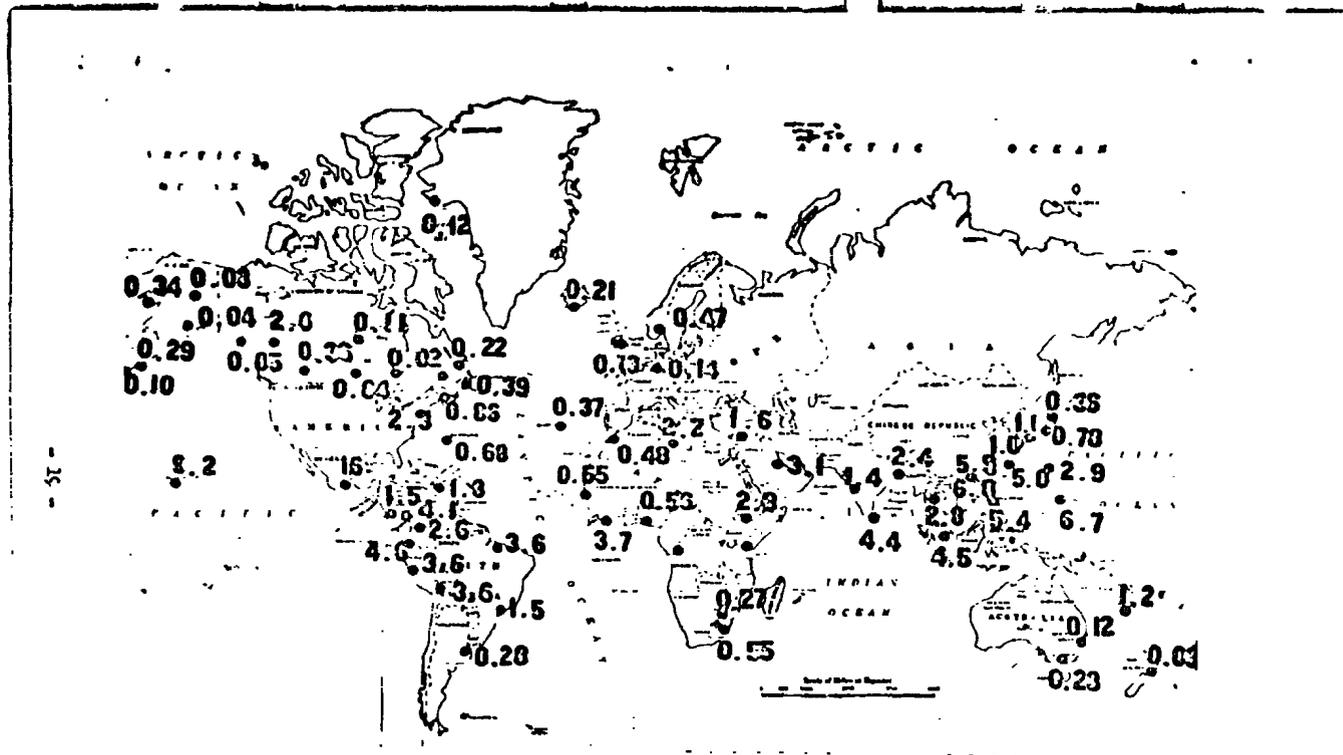


Fig. 8 - Radioactive Fallout, 4/6 - 4/24/54, Worldwide  
 mc/mi<sup>2</sup>, extrapolated to 4/1/55

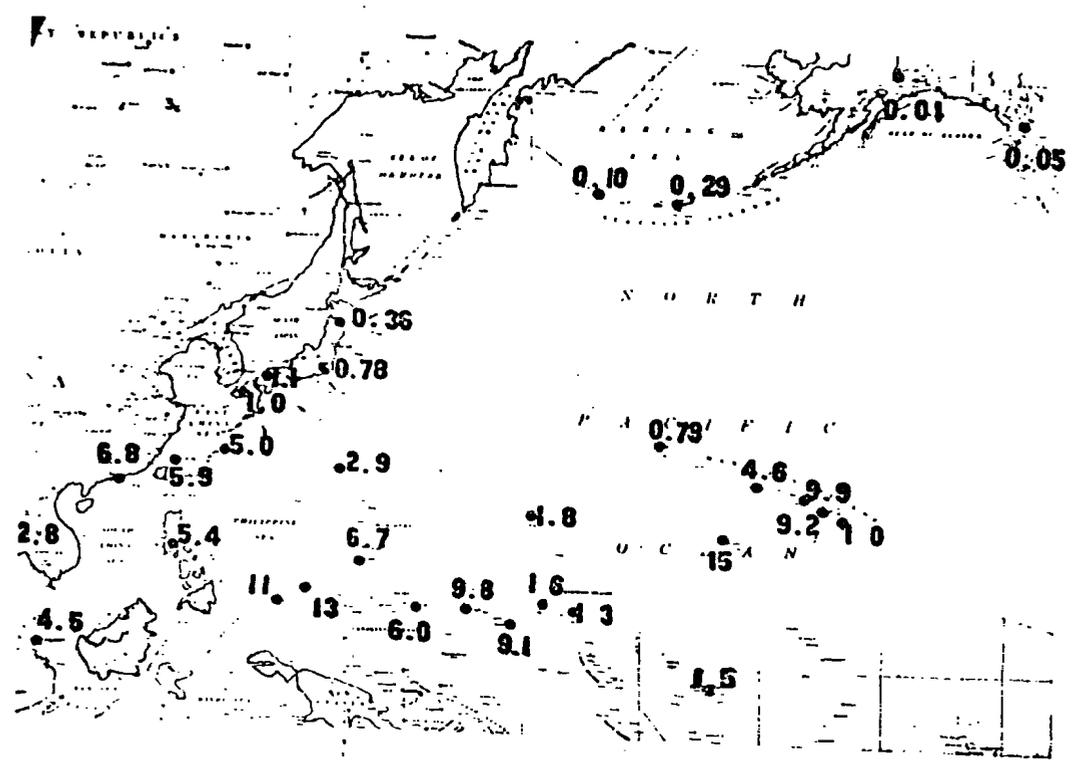


Fig. 9 - Radioactive Fallout, 4/6 - 4/24/54, Pacific  
 $mc/mi^2$ , extrapolated to 1/1/55





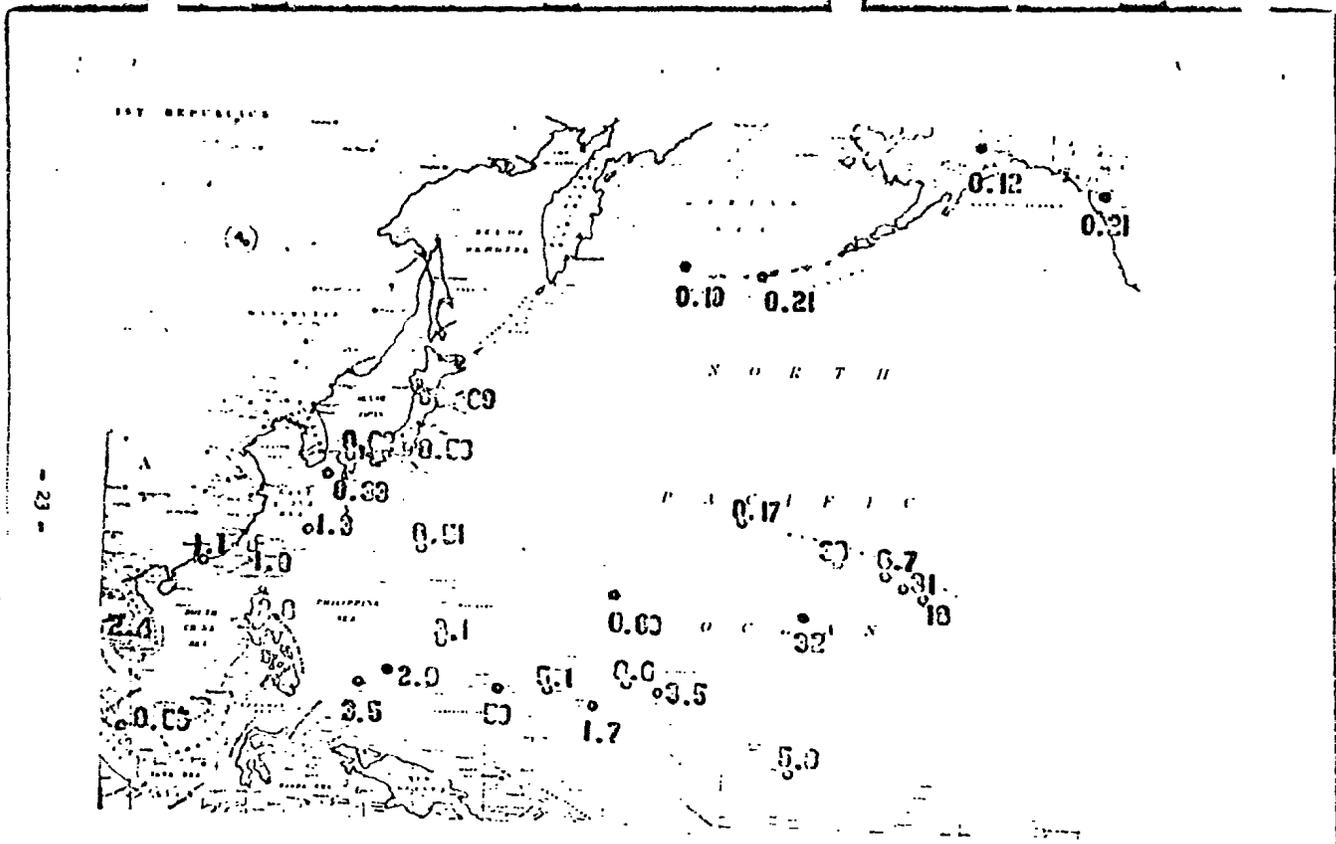


Fig. 12 - Radioactive Fallout, 4/25 - 5/3/54, Pacific  
 mcp/mi<sup>2</sup>, extrapolated to 1/1/55

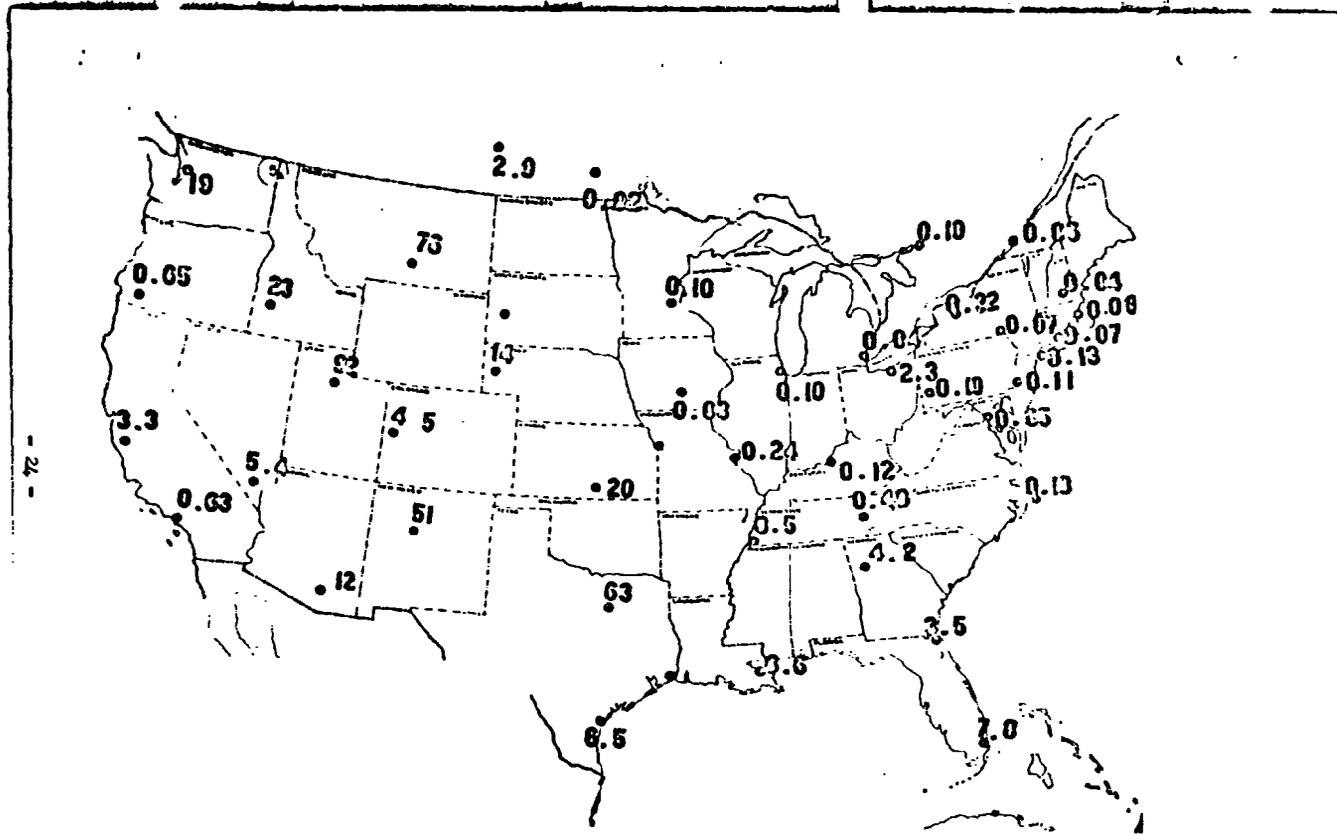


Fig. 13 - Radioactive Fallout, 5/4 - 5/12/54, U. S.  
 mCi/mi<sup>2</sup>, extrapolated to 1/1/55



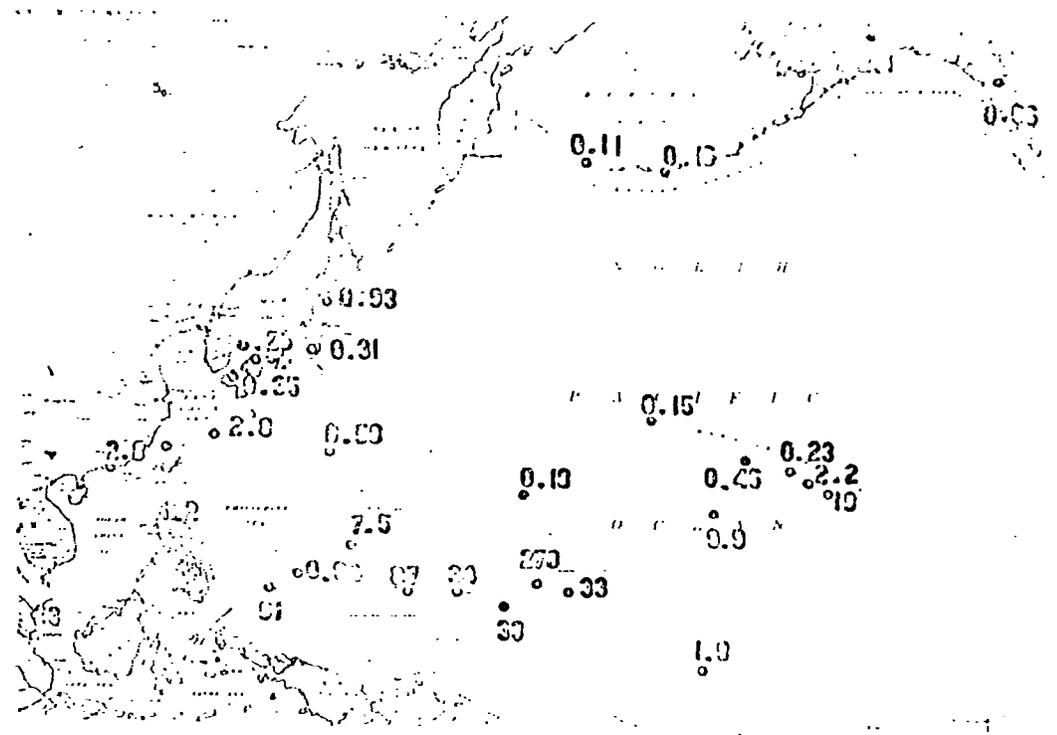


Fig. 10 - Radioactive Fallout, 5/4 - 5/17/54, in-131c  
m<sup>2</sup>/mi<sup>2</sup>, extrapolated to 3/7/55

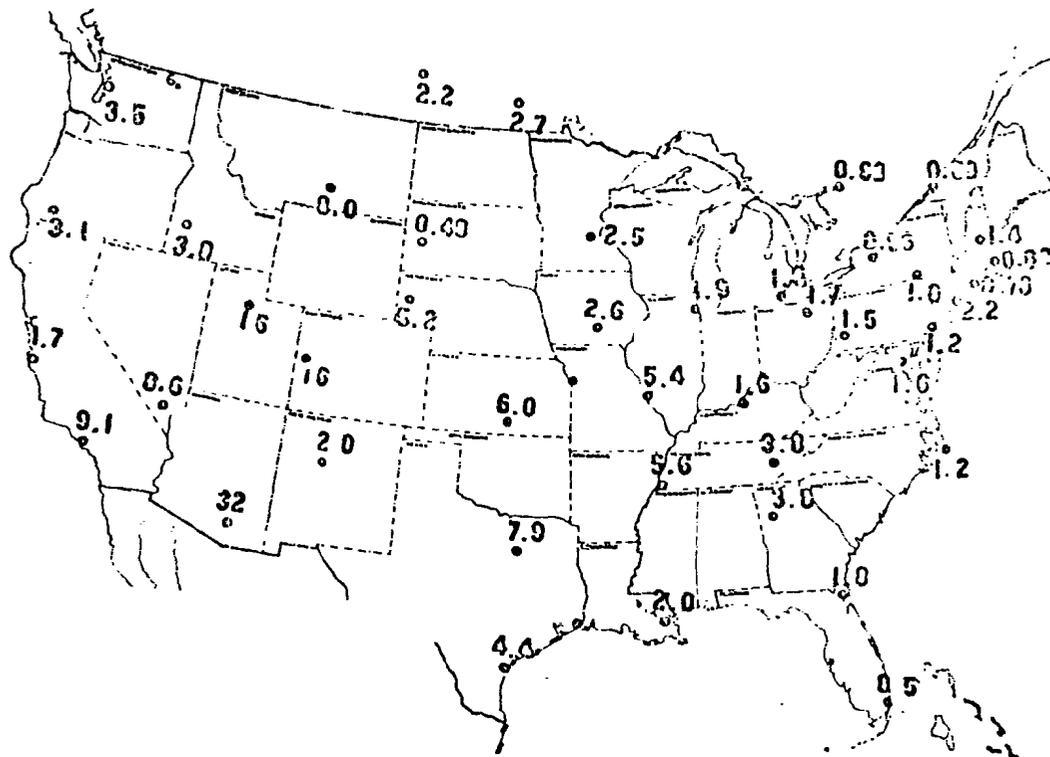


Fig. 16 - Radioactive Fallout, 5/13 - 5/31/54, U. S.  
 by  $\mu^2$ , extrapolated to 1/1/55

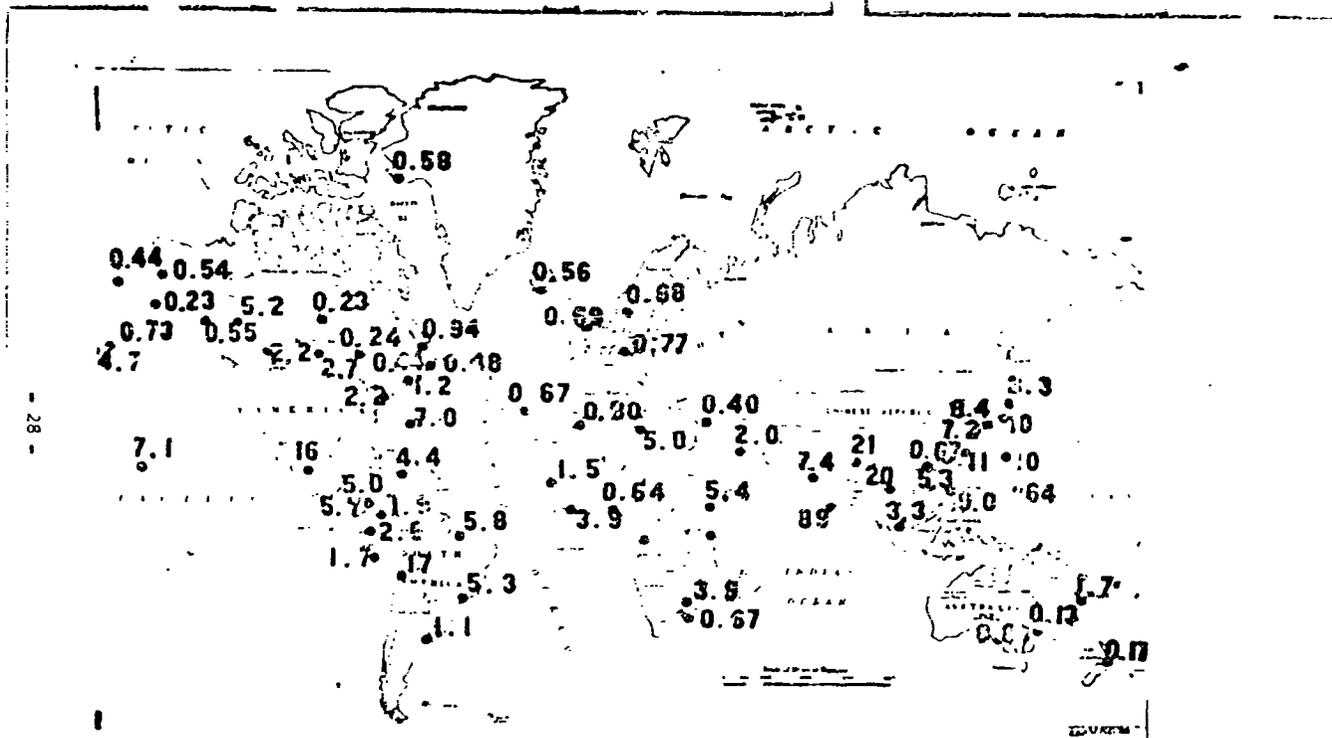


Fig. 17 - Radioactive Fallout, 5/13 - 5/31/54, worldwide  
 mc/mi<sup>2</sup>, extrapolated to 1/1/55







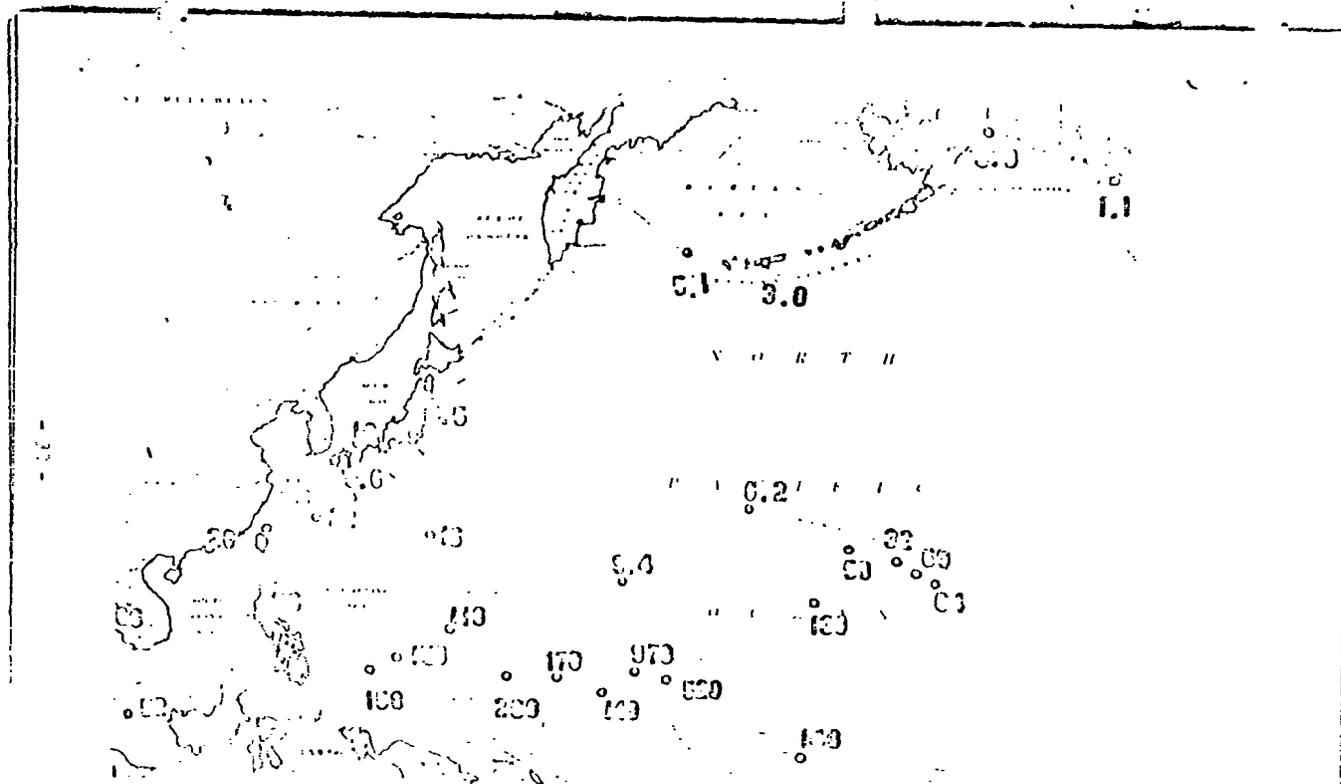


Fig. 21 - Radioactive fallout, Total  $\gamma$  20 - 5/31/54, Pacific  
 mc/m<sup>2</sup>, extrapolated to 1/1/55



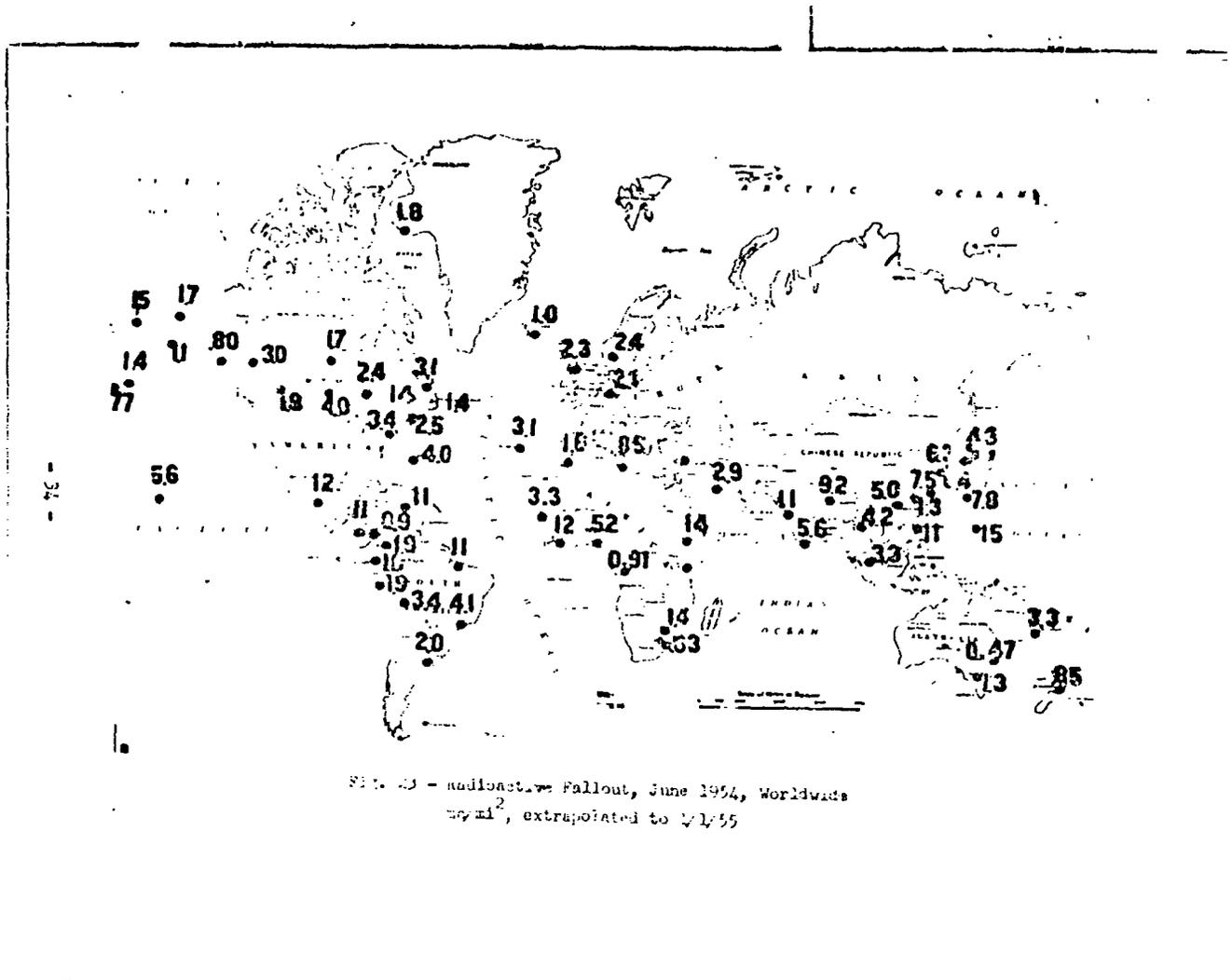


Fig. 23 - radioactive Fallout, June 1954, Worldwide  
 $\mu\text{Ci}/\text{mi}^2$ , extrapolated to 1/1/55

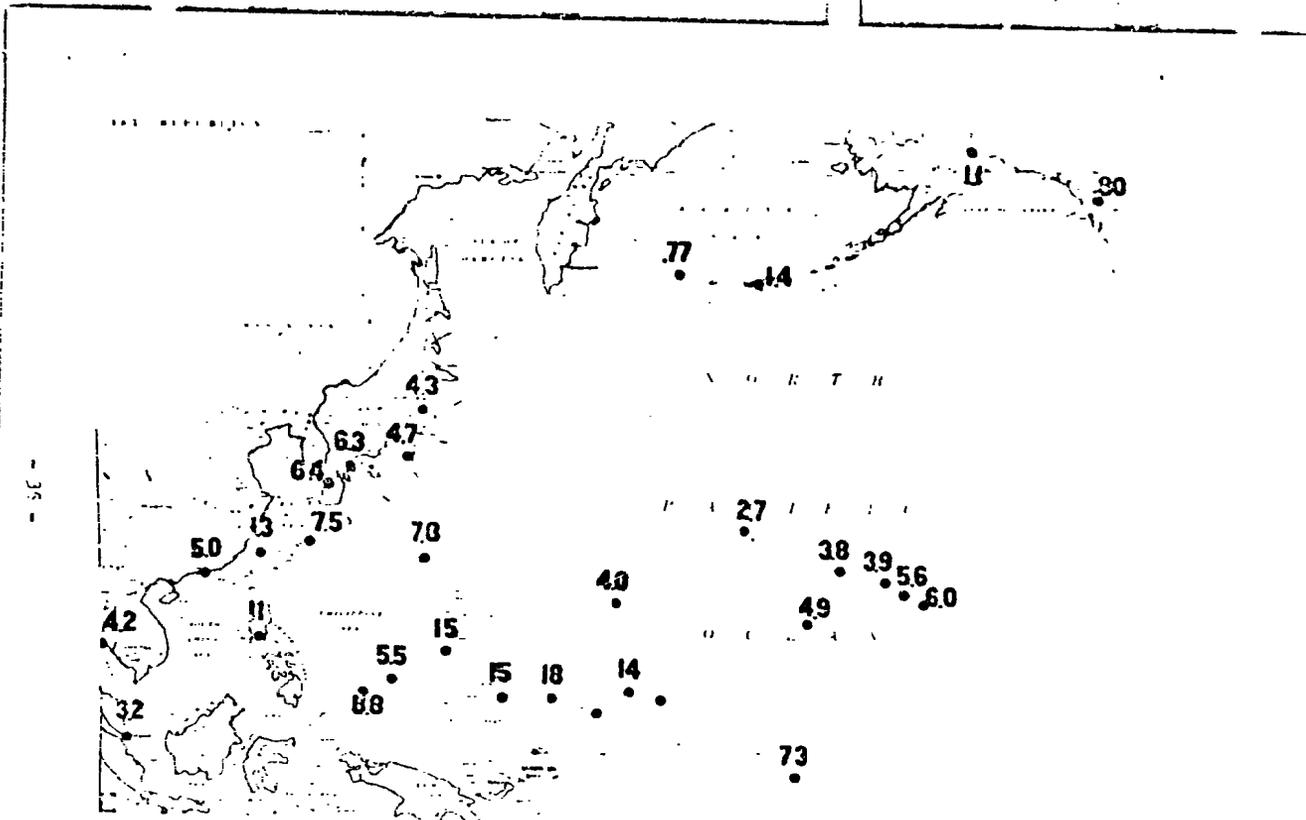
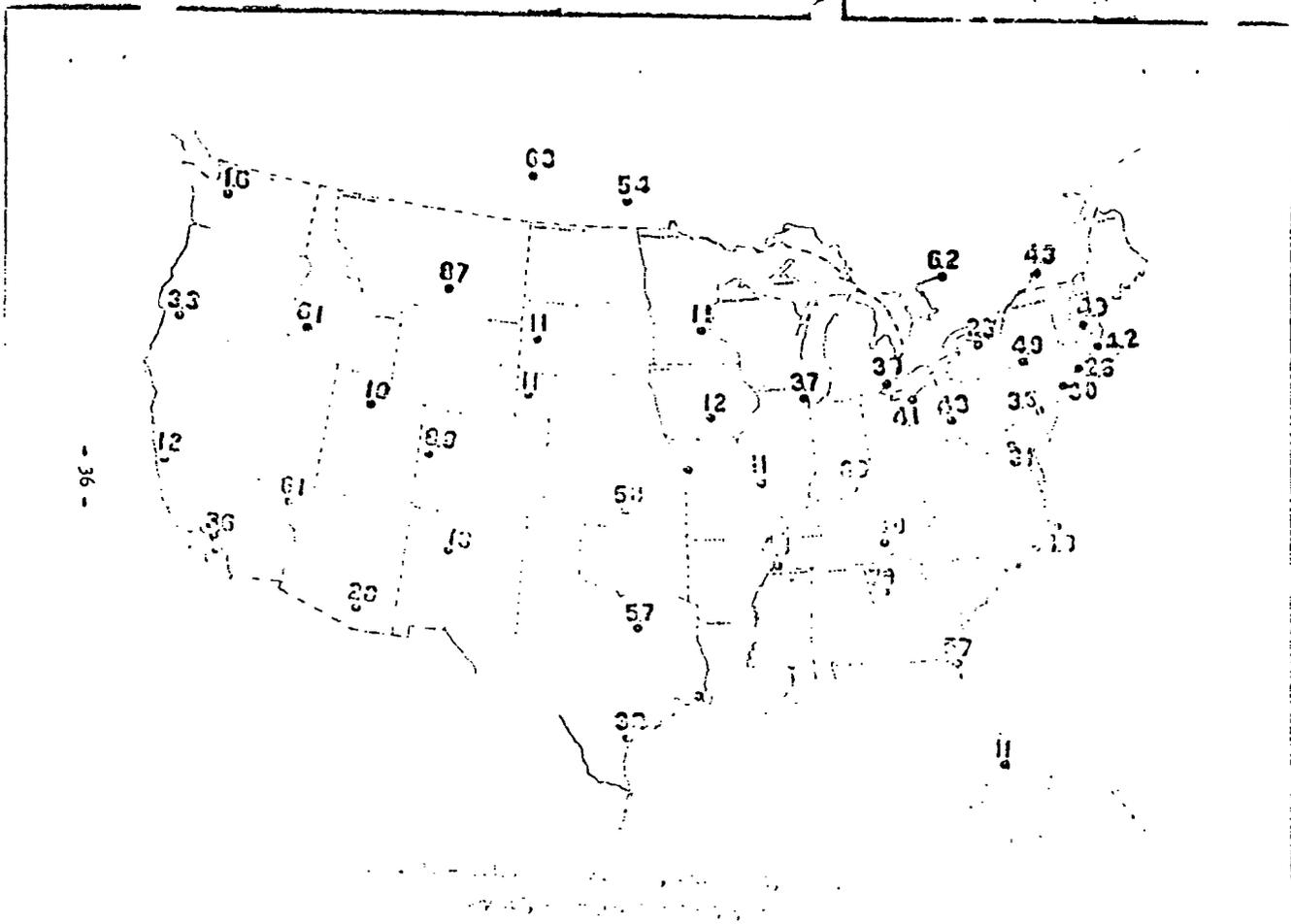


Fig. 10 - Radioactive Fallout, June 1954, Pacific  
 Region, extrapolated to 1/1/55





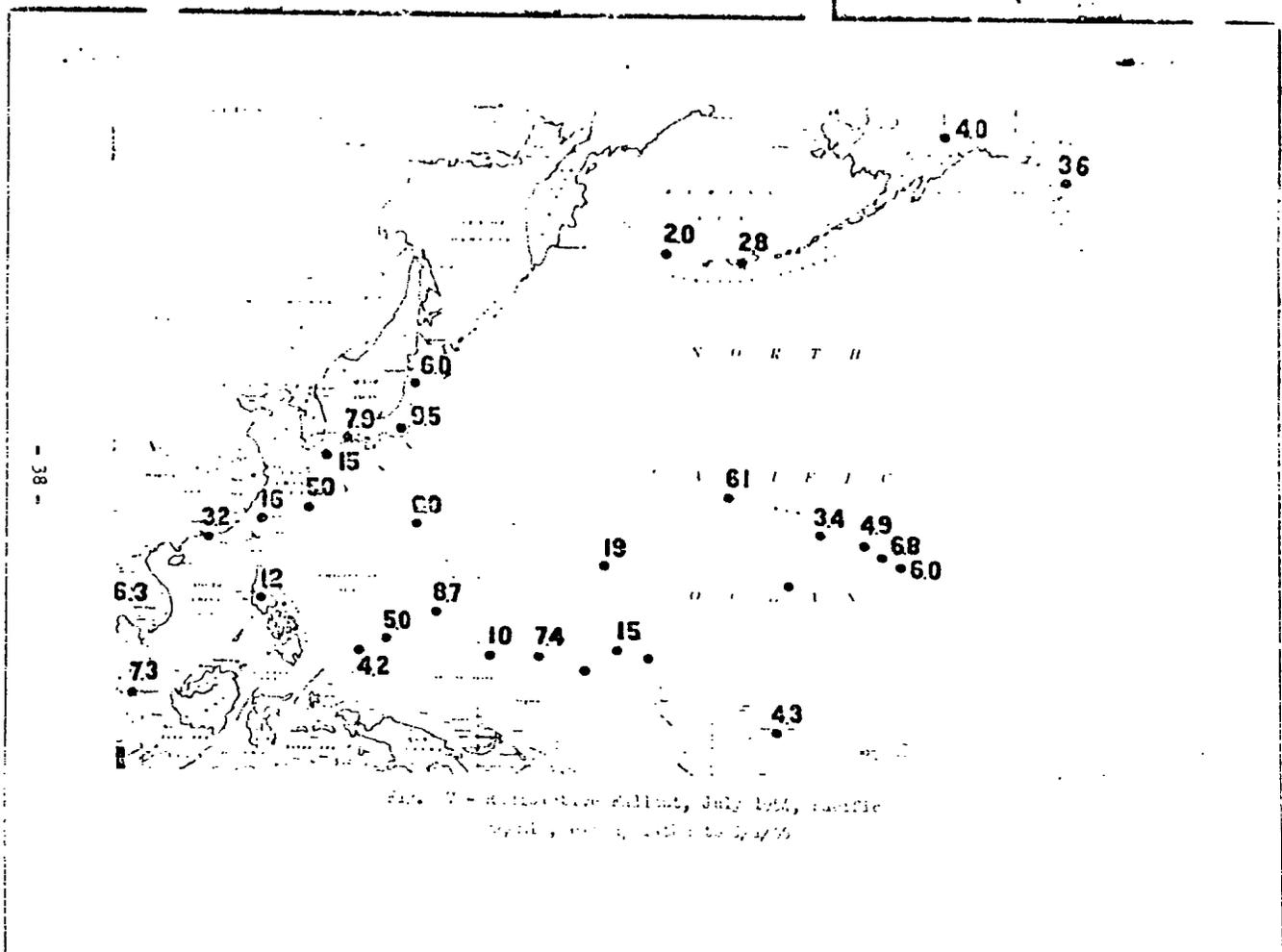


FIG. 7 - Relative rainfall, July 1955, Pacific  
 (Wind, 1000 mb, 1000 to 2000)

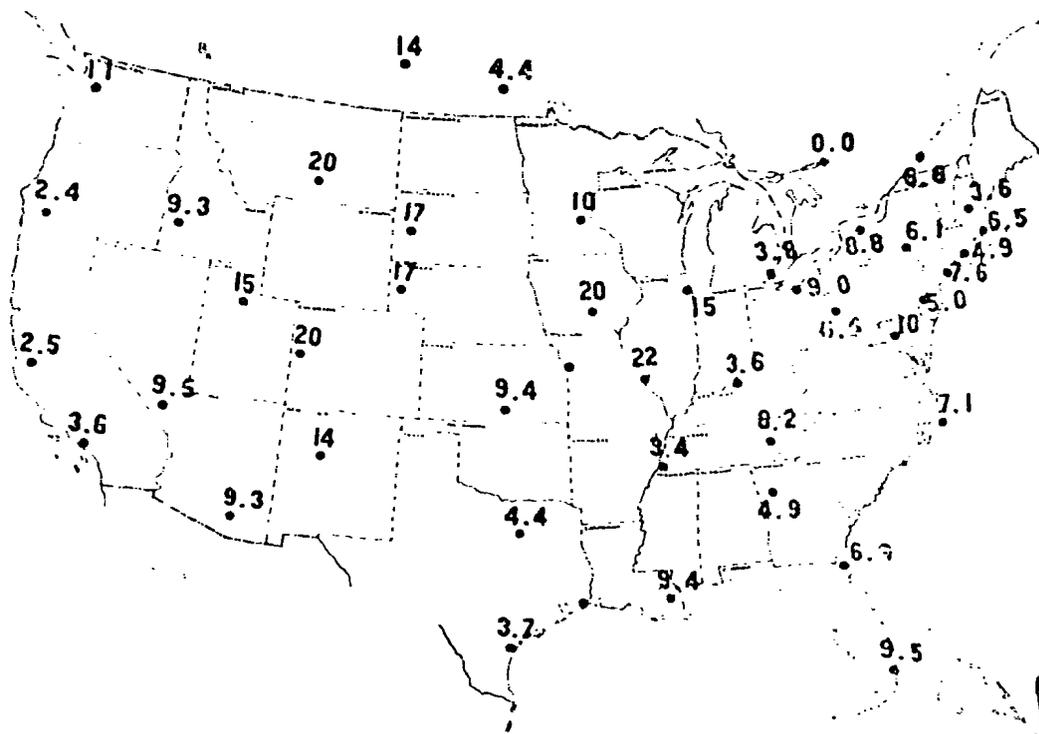


Fig. 21 - Representative Fillet, August 1964, U.S. ...  
total, extrapolated to 1/1/55

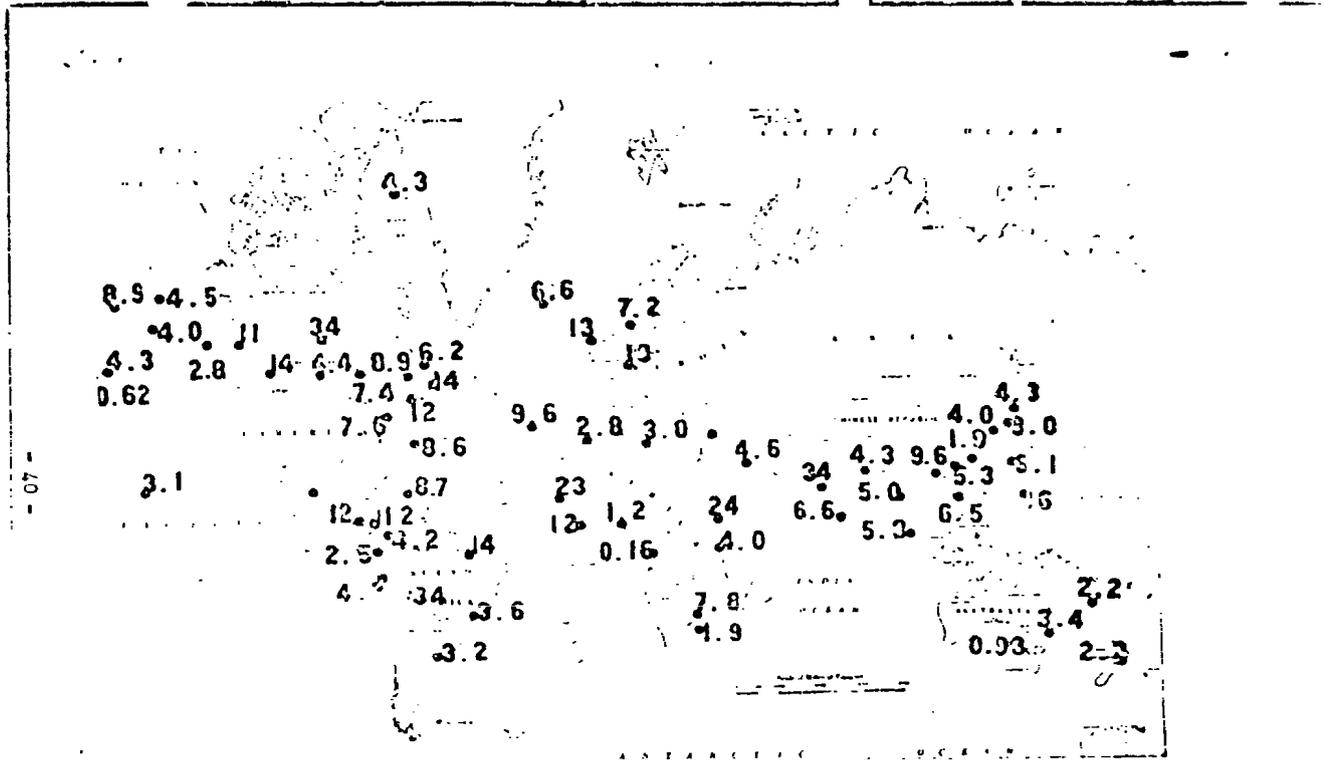
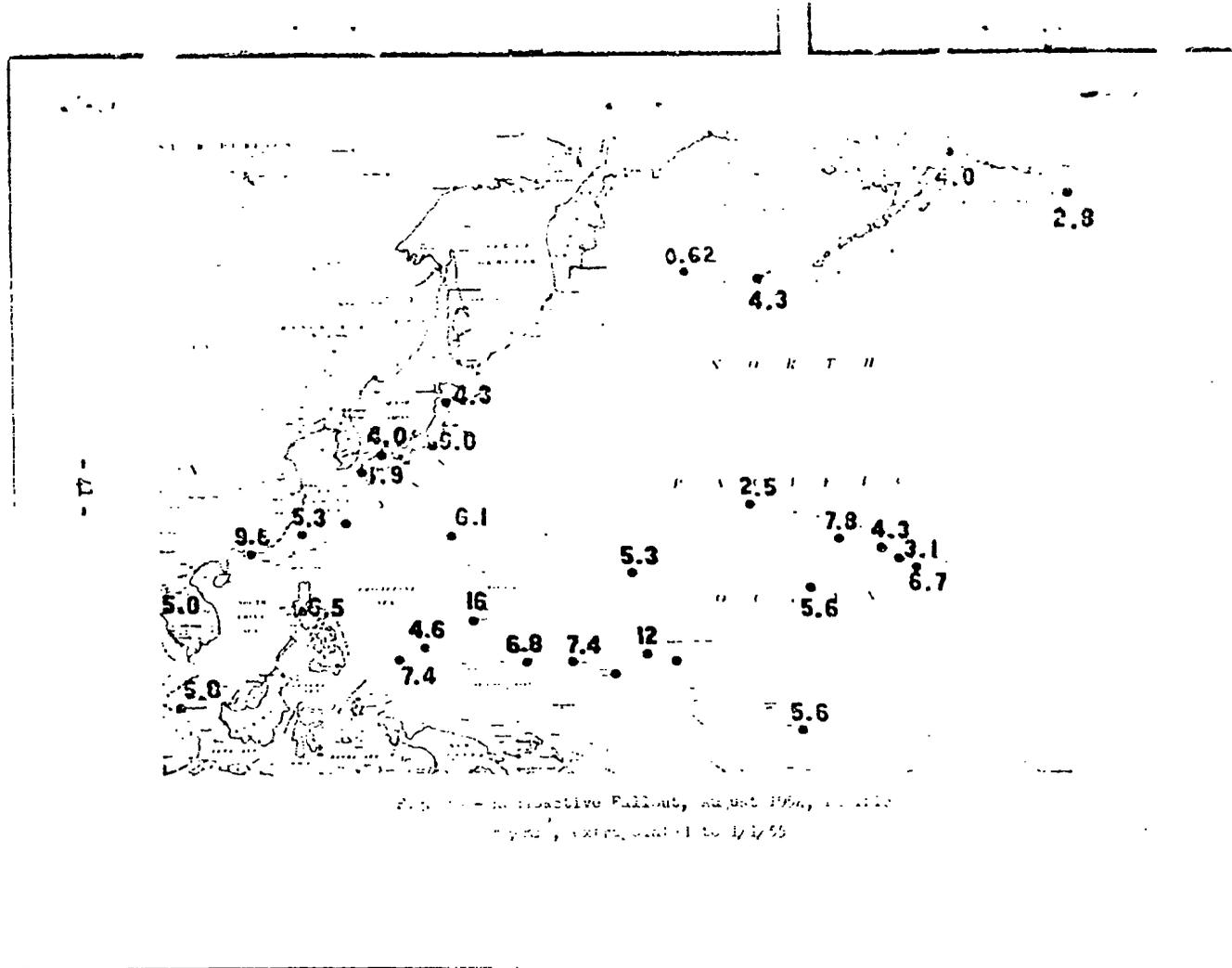


FIG. 29 - Relative Fallow, August 1954, (relative  
 amount, extrapolated to 1/2/55)



**END**