MARSHALL ISLANDS FILE TRACKING DOCUMENT

Record Number: 411

File Name (TITLE): Program 4- Nutron Measurements

Document Number (ID): 123709

DATE: [illegible]

Previous Location (FROM): CIC

AUTHOR: [illegible]

Addditional Information: _____

OrMIbox: 27

CyMIbox: _____

Again, many excellent photographic records were obtained, the analysis of which is underway at this writing.

123709

D. Program 4 - Neutron Measurements.

1. Object. The determination of total neutron flux as a function of both distance from the bomb and energy. Also, the determination of slow neutron intensity vs time at one position relative to the bomb.

2. Method. Total neutron flux over various energy ranges between 0.025 EV and 14 MEV were documented with threshold detectors. Six different elements were used as threshold detectors: Gold, Gold and Indium, Tantalum, Sulphur, Arsenic and Zirconium. For Mike Shot, 282 such detector samples were located at forty-seven stations from zero to 2500 yards West from zero along the reef. Zirconium was not used for King Shot because of the lack of sufficiently high energy neutrons from a fission weapon, but 120 samples of the other elements were placed at twenty-four stations along the reef to the SE of zero. Fission catcher cameras were used for both shots to measure slow neutron intensity vs time.

3. General Results.

a. Mike Shot. Approximately 35 threshold detector samples were recovered and are being analyzed in the Laboratory at Los Alamos. The single fission catcher camera used was destroyed by the shock.

b. King Shot. 38 samples were recovered and are being analyzed at Los Alamos. The two fission catcher cameras used were destroyed by shock.

E. Program 5 - Gamma Ray Measurements.

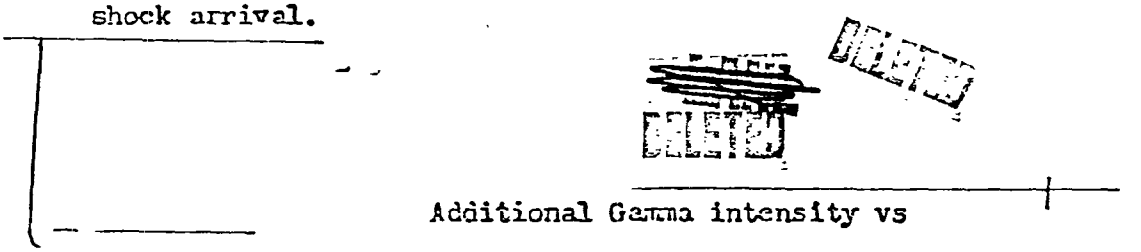
1. Object. To measure Gamma ray intensity as a function of time and position, including that due to fall-out, and to measure the total Gamma ray dose as a function of distance.

2. Method. Total Gamma dose was measured with film badges. Gamma intensity vs time with high resolution was measured with phosphor-photocell-oscilloscope-camera combinations for the first thirty seconds. Gamma intensity vs time with lower time resolution was measured with ionization chamber-recorder combinations. Samples for fall-out studies were collected in a variety of devices, both time differential and time integral in nature, located within Eniwetok Atoll and on other Atolls.

3. General Results.

a. Mike Shot.

(1) The film badge stations were nearly all destroyed; however, the stations from 4500 to 6000 yards will probably give meager data. Gamma intensity vs time (0.1 μs resolution) records were obtained up to shock arrival.



Additional Gamma intensity vs time (~ 1 ms resolution) data were obtained at Bogonbogo (4300 yards). These data indicated the pronounced influence of the shock wave upon Gamma radiation.

(2) Data were recovered from the ionization chamber-recorder combinations on Engebi, Runit, Biijiri, Aniyaanii, Parry,

Eniwetok and Rigili. Thus far no data have been recovered from the off-atoll stations, although some fall-out has been recorded on Kusaie and Ujelang. The decay rates indicate that the radiation varies as $t^{-1.3}$ to $t^{-0.8}$. The scatter of points for times in excess of nine hours is somewhat greater than would be expected for a continuous recording system. It is hoped that a more detailed study may resolve an additional component of the decay scheme, such as perhaps an exponential factor.

(3) A variety of fall-out samples was collected both within and external to Eniwetok Atoll. Analysis of these samples is being conducted at this time.

b. King Shot.

(1) Film badge stations out to 1200 yards were destroyed, the remainder of the badges were recovered and are being analyzed at Los Alamos.

(2) Data was obtained from two out of three high time resolution Gamma intensity vs time recorders utilized. These data should be adequate to supply the information required.

(3) The ionization chamber-recorder combinations indicate no significant fall-out on any of the islands of Eniwetok Atoll except the shot island. At 2000 yards on Runit, the peak radiation was approximately 5000r/hr at K/5 seconds, decaying very rapidly to approximately

0.5r/hr at K/1 minute. The radiation intensity from 1 minute to 2 hours decayed exponentially with a half life of approximately 5 minutes. No fall-out has been reported from any of the off-atoll stations at this time.

(4) Fall-out samples were collected at twenty-nine stations within Eniwetok Atoll. Since few samples produced radiation in excess of 10mr/hr, it is clear that there was no appreciable fall-out at any of the project stations.

F. Program 6 - Blast Measurements.

1. Object. To study the characteristics of the blast wave, its propagation through air, water, and earth, and its transient effects upon those media. In particular, data were sought to document the following: (a) Pressure vs time as a function of distance from zero at the surface; (b) Material velocity behind the shock front at known positions in space; (c) Shock wind, afterwind, and sound velocity before, during and after blast wave passage; (d) Water surface motions in both deep and shallow water; (e) Sub-surface earth accelerations; (f) Sub-surface pressures in both deep and shallow water, to include accoustic pressure waves at great distances; (g) Air density vs time before, during and after shock wave passage; (h) Free air pressure vs time at known positions in space.

2. Method. The experimental techniques utilized to accomplish the above were many and varied and cannot be described in a brief report of this type. Reference (3) is suggested as a source for this information.