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MEMORANDUM BY THE CHIEF OF STAFF, U. S. AIR FORCE

to the

SECRETARY OF DEFENSE

on

LONG RANGE DETECTION OF ATOMIC EXPLOSIONS

1. I believe that an atomic bomb has been detonated over the Asiatic land mass during the period 26 August 1949 to 29 August 1949. I base this on positive information that has been obtained from the system established by the U. S. Air Force for the long range detection of foreign atomic energy activities.

2. Fission products have been collected since 3 September 1949. Although the system is only partially developed, we have been fortunate in securing sufficiently large and fresh samples for effective scientific analysis. The cloud containing fission products was tracked by the U. S. Air Force from the Kamchatka peninsula to the vicinity of the British Isles where it was also picked up by the Royal Air Force.

3. Conclusions by our scientists based on physical and radiochemical analyses of collected data have been confirmed by scientists of the AEC, United Kingdom and Office of Naval Research.

4. At my request, Dr. Vannevar Bush, Dr. J. Robert Oppenheimer, Dr. Robert Backer and Admiral William S. Parsons have reviewed our findings and concur unanimously in our conclusions.

5. The Joint Chiefs of Staff have been informed of the contents of this letter and the attached report.

Hoyt S. Vandenberg

read by
Mr Early
Mr Johnston
Mr Truman
21/Sept/49

J.M.S.
AFOAT.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS UNITED STATES AIR FORCE
WASHINGTON 25, D. C.

20 September 1949

General Hoyt S. Vandenberg
Chief of Staff
United States Air Force
Washington, D. C.

Dear General Vandenberg:

At your request I convened an advisory group which met at 1712 "G" Street, N. W. at 1000, 19 September 1949, to review certain significant scientific data reported by your atomic detection system and to examine the technical analysis of these data.

The group consisted of Dr. J. Robert Openheimer, Dr. Robert Bacher, Rear Admiral W. S. Parsons and myself.

After careful consideration of the facts presented by your technical staff, we unanimously agree with their conclusions as presented in Tech. Memo. No. 37, copy attached hereto.

Sincerely,

V. BUSH

Incl.
Tech Memo No 37
(cy 2, 19 Sep 49)

J R Oppenheimer

J. ROBERT OPENHEIMER

Robert F. Bacher

ROBERT BACHER

W. S. Parsons

W. S. PARSONS

by Vandenberg
Norstad
Early
Johnson
1949

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AUTH CS, USAF
S.R.S.
19 Sep 49

19 September 1949

Tech. Memo. No. 37

MEMORANDUM FOR MAJOR GENERAL NELSON:

SUBJECT: Atomic Detection System Alert No. 112

SITUATION

Airborne and ground level sampling operations conducted over the north Pacific from Japan to Alaska, over the North American continent and over the north Atlantic from Canada to Norway reveal the presence of highly abnormal radioactivity in air masses which emanated from Asiatic land masses.

FACTS BEARING ON THE PROBLEM

1. Age determination correlated with preliminary meteorological analysis establishes the fact that fissionable material was fissioned between 26 and 29 August at a location over the Asiatic land mass lying between the 35th east meridian and the 170th east meridian. (See Incl. A)

2. The decay rate of the first filter sample collected by aircraft showed the presence of radioactivity with a gross half-life of seventy (70) hours, which strongly indicated the presence of fission products.

3. Subsequent measurements indicated that the half-life of this filter sample was increasing with time as would be expected in the case of fission products.

4. Radiochemical analysis of samples collected at fifteen (15) widely separated points in the cloud resulted in the isolation of Neptunium 239 and the following fission products:

Ag^{111} Ba^{140} Mo^{99} Zr^{95} Ce^{144} Ce^{143}

Ru^{103} Ru^{106} (See Incls. B, C, D & E)

5. Absorption and decay curves made on each of the above fission products and Np^{239} provided positive identification of the products. (See Incls. B, C, D & E)

6. Ratios of the fission products established the date of origin as between 26 and 29 August. Gross decay curves of the mixed fission

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products and absorption curves of the Cerium isotopes support the above determination of age. (See Incls. B & D)

7. Auto-radiographs have shown that the radioactive material is in part particulate in nature. A few particles have been isolated and found to be much smaller and chemically different than those obtained either from Bikini or Eniwetok tests. (See Incls. B & D)

8. The fission product ratios consistently indicate Plutonium fission, particularly the ratios of Ruthenium isotopes. The observed fission products and fission ratios are not consistent with the fission of Uranium 235, either by thermal neutrons or by normal fission spectrum. They are also not consistent with ratios experienced from any devices utilizing normal Uranium. The presence of Neptunium definitely indicates Uranium 238. (See Incls. B & C)

9. An independent analysis of an airborne filter sample submitted to the Los Alamos Scientific Laboratory confirmed the presence of Ag, Ba, Mo, and Ce and the absence of lead-carried natural radioactivity. (See Incl. C)

10. An independent collection of material was made by the British with airborne filters from northern Scotland during flights to the north, northeast and northwest extending to 72° latitude. Subsequent analysis resulted in the positive identification of fresh fission products of Ce, Ba and I. A combination of gross decay curves and absorption measurement established the date of origin as between 27 and 30 August 1949. The barium and iodine decay curves agreed with this date of origin. Most flights were at 20,000 ft. The maximum average activity in the air over the flight (approximately 6-10 hours duration) was 0.35 disintegrations per minute per cubic ft. The only flight at 30,000 ft. (4 hours duration) on 11 September gave 0.25 disintegration per minute per cubic ft. Successful auto-radiographs gave positive results with an exposure time of four days. One large particle, giving ten (10) disintegrations per minute and thirty-six (36) extremely small particles, have been located. The particles in the filter are extremely fine and all but a few percent of the activity in the filters is in the extremely fine particles. Further radiochemical analysis is in progress on Cerium, Barium and Iodine. (See Incl. B)

11. An independent analysis of material collected from the roof of the NRL in Washington, D. C., and an analysis of an airborne filter sample submitted to NRL confirmed the presence of fission products in the air masses which passed over Washington, D. C. (See Incl. E)

CONCLUSIONS

1. Fissionable material

August at some point on the Asiatic land mass between the east 35th meridian and the east 170th meridian.

2. The fission products resulted wholly or largely from the fission of Plutonium.

3. Natural Uranium or Uranium 238 was present in close proximity to the fissionable material at the time of the reaction.

4. The observed phenomena are all consistent with the view that the origin of the fission products was the explosion of an atomic bomb whose nuclear composition was similar to the Alamogordo bomb.

5. A variety of alternative explanations have been proposed. Upon examination none of these turns out to be technically likely. Of those which although unlikely are yet consistent with the data, all call for the use of enough Plutonium to have made an atomic bomb.

6. We therefore believe that an atomic bomb has been detonated as stated.

DOYLE L. NORTHRUP
Technical Director, AFOAT-1

5 Incls. (not attached)
Incl A - U S Weather Bureau Report
Incl B - Tracerlab Technical Report
Incl C - Los Alamos Report
Incl D - United Kingdom Scientific Report
Incl E - Report of Office of Naval Research