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ATOMIC ENERGY COMMISSION

REPORT OF UNITED STATES OBSERVERS OF A NUCLEAR TEST

Note by the Secretary

The Chairman has requested that the attached letter, and enclosure, from the Assistant to the Secretary of Defense (Atomic Energy) be circulated for the information of the Commission. The attachments have been referred to the Division of Military Application.

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OFFICE OF THE SECRETARY OF DEFENSE  
WASHINGTON 25, D.C.

November 26, 1957

Dear Mr. Strauss:

At the invitation of the British extended through Admiral Sir Michael Denny, two representatives of the Department attended the recent United Kingdom nuclear test at Christmas Island. I am forwarding herewith a copy of the report of the United States observers for your information.

Sincerely yours,

/s/

Herbert B. Loper  
Assistant to the Secretary  
of Defense (Atomic Energy)

Enclosure:  
ASDWP-Op-36 Memo  
dtd 19 Nov 57.

The Honorable Lewis L. Strauss  
Chairman  
U.S. Atomic Energy Commission

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DEPARTMENT OF DEFENSE  
ARMED FORCES SPECIAL WEAPONS PROJECT  
WASHINGTON 25, D.C.

19 November 1957

MEMORANDUM FOR THE ASSISTANT TO THE SECRETARY OF DEFENSE FOR  
ATOMIC ENERGY:

Subject: Trip Report - U.K. Christmas Island Test, November 1957

1. As directed by the Chief of the Armed Forces Special Weapons Project, Brigadier General J.W. White, USAF, Deputy Chief of the Armed Forces Special Weapons Project, and Rear Admiral G. S. Patrick, USN, Director, Atomic Energy Division, Office of the Chief of Naval Operations, proceeded to Hickam Air Force Base in Hawaii on 1 November to observe the British atomic test at Christmas Island. On arrival at Hickam on 2 November, the British Liaison Officer advised that the Task Force Commander requested us to fly on to Christmas Island on 3 November. On arrival at Christmas, it was announced that the test had been postponed from 5 November to 8 November due to the excessively heavy rain over the weekend which had grounded out cameras and electrical equipment.

2. The Task Force Commander was Air Vice Marshall Wilfred E. Milton, RAF, who met us very cordially at the airfield and was accompanied by Air Commodore C. T. Weir, who was in command of the Air Detachment at Christmas Island.

3. The next day we received a tour of the operations and noted the following:

a. About 3,000 people make up the air and maintenance camp on the Island with about 900 in the ships which operate out of London Port on the Northwest corner of the Island. The camp of operations is across the Northeast point of the Island. Christmas Island is about 20 miles wide East to West and about 30 miles long in the direction of its Northwest-Southeast axis.

b. The Operation Board in the JOC listed the following aircraft:

- 5 Valiants
- 4 Canberra (Pr-7) for weather and photography
- 8 Canberra (B-6) for samples
- 7 Shackleton for patrol
- 5 Hastings for logistic support
- 8 Whirlwind for rescue and monitoring

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1 Auster (Piper Cub type) for insect spraying and light jobs

Plus 3 Dakotas, which are used to supply the outlying weather stations.

c. London Port has been dredged to about 9 feet in depth for use of landing craft. The 3 destroyers, one LST and 3 tenders usually anchor well outside the reef or tie to buoys (No aircraft carrier in this operation).

4. After the view of the station we decided that we would take advantage of the 3-day delay by returning to Pearl where we talked to representatives of the Commander in Chief, Pacific and our respective Service commanders, and were back on Christmas Island the evening before the shot. The day of the shot the main camp was completely evacuated. We were the last to go to the JOC. We gathered they did not want us on hand until the drop aircraft had taken off. We learned that the operation would be delayed about a half hour from the scheduled 0730 shot time. A Liberian freighter had been sighted in the danger area. After a 5 o'clock sighting by a Shackleton patrol aircraft the British were able to talk with the ship "EFFY" only on the distress frequency (500 KCS). They advised her to reverse course and clear the danger area. In the meantime, the British destroyer, COSSAK, was steaming toward her to escort her out of danger. Fortunately, by shot time she was about 45 miles away with the escort vessel steaming close by, advising her with regard to the actual time the shot would go and then releasing her to pass clear of Christmas Island.

5. About 30 minutes before shot time we were escorted to the JOC and permitted to listen to the reports on the aircraft circuit Patrol aircraft, as well as the drop aircraft and its escort and the sampling aircraft, were now in position. An initial run was made by the drop aircraft to check existing wind conditions and permit everyone to get in tune with the operation. Then came the diving run.

6. It is interesting to know that the live run started about 7 miles North of JOC and passed within 3 miles of control. The bomb line passed over the Northeast corner of Christmas Island airfield across the Bay of Wrecks with a Surface Zero point 14 seconds (at 425 knots) beyond the Southernmost point of the Island. The Valiant aircraft was making 425 knots over the ground, flying at about 45,000 feet. The burst was in the neighborhood of 8,000 feet above the water. The group of personnel we were standing with in JOC were told to face away from the burst and were not permitted to leave the building until 15 seconds had elapsed after the shot. We were given no special equipment and were told to keep our eyes closed. At the end of 15 seconds we rushed outside to observe the fire ball for a matter of about 10 seconds before it disappeared in cloud cover. The fire ball appeared to have a diameter of about 3500 yards and at 30 seconds after the explosion seemed to be about one diameter above the earth. This was difficult to gauge because of the coconut palms about us obliterating the horizon. The shock wave arrived with a terrific crack to the ears and it was followed in about 10 seconds with a double lesser crack and again in about 8 seconds with another double even lighter crack. The rumble persisted for several minutes as the shock wave traveled away from us. Due to the moist

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atmosphere, we could see the shock wave spread out with a definite vapor ring which was sufficiently thick to hide the sun as the wave passed between us and the sun.

7. There was no further observation of the cloud and fire ball rise, although the next day we were shown pictures of the burst. The fire ball apparently developed sideways and down with a dripping mushroom stem which did not reach the water. A crystal ice skirt formed just above the stem. As the cloud moved skyward, the number of ice skirts increased until 5 distinct ice skirts were visible. The widely spread cloud seemed to push against a light white line which was dented upward at the center top. We presume this was the tropopause reported at about 60,000 feet. This was the limit of observation of photographs that we were permitted to see. Photographs from initial burst until cloud had formed were removed.

8. We left the Command Post and proceeded to the airfield to greet the returning bombing aircraft. We met the crew and heard them say "That was a good one". They received the praise of Air Commodore Weir for a well done delivery. The Task Force Commander was located in a command observation post about 14 miles from Surface Zero. Here the officers stated that everyone was thrown up and down and had a hard time maintaining his footing during the blast wave. The blast wave that hit the JOC at 23 to 27 miles distance broke practically all the quarter-inch reinforced glass windows in the scientists' air-conditioned building, as well as cracking the many windows that were left open. Automobile windows in the vicinity, even though rolled up, were not broken. Dr. William Cook, the senior scientist, indicated that the overpressure in that area was probably about one-half pound per square inch.

9. The following day, Admiral Patrick took a trip to the southeast point by helicopter and observed at a distance of 6 1/2 to 10 miles from Ground Zero that timber and debris thrown up on the beach were burning with a great deal of flame. On landing at a point about 5 miles from Point Zero birds were observed to have their feathers burned off to the extent that they could not fly. Dead fish were reported to have been washed ashore in the vicinity of Surface Zero. The day before the shot the British Navy had come to the South end of the Island where the greatest bird population is located and trucked off about 500 birds and retained them in cages at the North end where they were released after the shot. At about 7 miles from Ground Zero there were 3 or 4 tin houses (a recording station) with most of the corrugated sides torn away. The Yagi type antennae on the end of the cross trees were still standing.

10. We were taken everywhere on the Island except to the three triangulation stations and the weapon assembly building and area. It is worthwhile to note that the British conducted the shot with a very austere program. We were told that they now realize that the atomic tests will go on for some time. Hence, they are commencing now to put in a more permanent installation. They have, for example, requested funds for asphalt covering their road system, as well as putting up more permanent building for barracks. However, we must say their tent city stood up very well under the blast which damaged several of their wood structures. The yield of weapon tested at this time is perhaps the largest they can expect to conduct in this immediate area without creating costly damage to the equipment and temporary structures now existing.

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11. Subsequent to our return from Christmas Island, certain calculations have been made based on information noted above, although at the time it seemed that the weapon was less than 1 MT, the analysis of broken glass and fire would place the yield between 1 and 3 MT. In this connection, a London release, date line by November 9 by U.P., stated that "A specially equipped Royal Air Force Valiant jet bomber dropped yesterday's bomb which sources reported was in the 10 MT range."

12. It is interesting to recall some of the conversation which is listed below:

a. Dr. William Cook stated that, given a year to 18 months, they would have the technique of building a hydrogen bomb, but they would certainly have it sooner if the United States told them how they designed it.

b. Dr. Cook was overheard to say that he would not return to England until Mr. Penney let him know if another shot was required, as he (Dr. Cook) felt that the shot met all expectations. It is interesting to note that 2 days later in San Francisco, Rear Admiral Patrick talked with Dr. Cook as he was buying a ticket for London and hoping to arrive no later than 12 November

JOHN W. WHITE, Brig. Gen., USAF  
Deputy Chief  
Armed Forces Special Weapons  
Projects

G. SERPELL PATRICK, RADM, USN  
Director, Atomic Energy  
Division  
Office of Chief of Naval  
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