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UNITED STATES PACIFIC FLEET  
Headquarters of the Commander in Chief  
RG 326 US ATOMIC ENERGY

COMMISSION

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31 October 1953

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Folder CASTLE RADIOLOGICAL SAFETY

From: Commander in Chief U. S. Pacific Fleet  
To: Commander Joint Task Force SEVEN

Subj: Radiological Hazards in the Marshall Islands Area during Operation CASTLE

- Ref:
- (a) CJTF 7 Secret ltr J-3/903 X 729.3 of 30 Jul 1953
  - (b) US AEC New York Operations Office Report NYO-4522 on "Radioactive Debris from Operation IVY" of 28 Apr 1953
  - (c) CINCPAC Secret ltr FF1-1 A16-1 Ser 0035 of 22 Apr 1952
  - (d) CJTF 132 Secret ltr of 14 Jul 1952; Subj: "Safety Measures during Operational Phase of IVY"
  - (e) CINCPAC Secret ltr FF1-1 A4-3 Ser 0073 of 25 Aug 1952

1. Reference (a) sets forth preliminary planning of CJTF 7 regarding radiological safety measures proposed for Operation CASTLE in relation to those implemented for Operation IVY, and requests CINCPACFLT comments or suggestions in order that task force planning may be realistic and mutually agreeable to all concerned. For convenient reference, the task force plan is summarized in paragraph 2 below.

2. CASTLE Radiological Safety Plan proposed by CJTF 7

a. No special efforts will be implemented by JTF 7 in support of the following safety measures:

- (1) Atomic cloud tracking outside the immediate danger area.
- (2) Sampling of drinking water on distant atolls. ~~53778~~
- (3) Evacuation of native populations.

b. The conclusion to discontinue the above safety measures (established for Operation IVY) is based on the following factors:

(1) Discussions between cognizant sections of both headquarters during February 1953.

(2) Reliance on the substantial radiological data obtained for IVY in reference (b).

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(3) Apparent unrealism in the assumption of health hazards of a magnitude conjectured for IVY.

(4) Policy of austerity in all phases of the operation dictated by recent reductions in fiscal year 1954 service budgets.

c. Specific aspects of the proposed plan, which are considered to provide a reasonable and safe compromise are as follows:

(1) Cloud tracking will comprise:

(a) WB-29 flights upwind from the shot site out to approximately 600 miles for the purpose of forecasting heavy secondary fall-out on the shot site with deviations in aircraft tracks to provide information on conditions in populated atolls near the upwind sector.

(b) Use of specified aircraft operating in the test area after shot time to provide reasonable indications of actual cloud movements.

(c) Pre-shot forecasts of cloud trajectories and fall-out areas with the continuation of such advisories by post-shot analyses of information from available sources (same procedure used for IVY).

(2) Sampling of drinking water at distant atolls will be conducted as a post-shot effort only in the event of radiological conditions requiring such action.

(3) Evacuation of native populations is not planned for JTF 7 effort due to the unavailability of task force equipment. However, consideration of populated islands will be one of the major factors influencing the decision to shoot.

3. Since IVY provides the sole criterion for the present determination of adequate safety precautions for the Pacific area incident to thermonuclear tests, it is considered appropriate to review the measures implemented for that operation. For this purpose, the basic directives, advisories and precautions pertinent to IVY safety are briefly outlined in paragraphs 4 through 6 below.

#### 4. Basic Directives for Safety during IVY

a. Reference (c). In consonance with the JCS decision relative to responsibilities during future tests at the Pacific Proving Ground, CINCPAC directed CJTF 132 to:

(1) Advise CINCPAC at an appropriate time of conditions and precautions involved in the tests and appropriate precautions to ensure safety

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of inhabited islands and of surface and air units of the Pacific other than those of JTF 132.

(2) Take all possible measures to minimize hazards to inhabitants of populated islands of the Pacific.

b. Reference (e). CINCPAC directed CINCPACFLT to:

(1) Assume complete responsibility for CINCPAC and take such action as necessary to provide for the safety of all units and populated areas of the Pacific, except those attached to JTF 132, incident to the hazards introduced by IVY.

(2) Keep CINCPAC and CNO informed of the provisions for safety to be taken in the Pacific.

5. Basic Safety Advisory for IVY

a. Reference (d). In compliance with reference (c), CJTF 132 advised CINCPAC as follows:

(1) With respect to the probability of health hazards, it is concluded that:

(a) The existence of such a hazard at Ujelang is a possibility, and therefore it is recommended that CINCPAC provide a capability for the temporary evacuation of the native inhabitants.

(b) Air routes through Wake may be affected for short periods of time.

(2) Using weather as a major safety measure, MIKE shot would be detonated at a time when wind conditions present minimal health hazards to inhabited islands, air and surface traffic routes of the Pacific.

(3) Further information relative to radiological hazards would be dispatched to CINCPAC in advisory messages as follows:

(a) At M minus 9 hours - a summary giving the prognosis of the atomic cloud trajectory for the initial 70-hour period, including best estimates of hazards to air and surface routes and the radsafe outlook for Ujelang.

(b) M to M plus 8 days - a daily summary (2000 local time) of radsafe information based on:

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1. Cloud tracking to 1000 miles in the significant quadrant, probably northeast from zero point.

2. Monitoring of water samples from certain inhabited atolls to a radius of approximately 600 miles.

3. Radiological reports from fixed weather stations.

6. Safety Measures in the Pacific Area during IVY

a. In order to provide for the safety of areas and units other than those assigned to JTF 132, CINCPACFLT implemented the following measures for IVY:

(1) Temporary evacuation of Ujelang by a PACFLT vessel.

(2) Airborne surveys of the Hawaiian, Marshalls, Carolines and Marianas Islands supplemented by ground checks as practicable as outlined in reference (b).

(3) Film badge survey of Wake and Johnston Islands.

(4) Reconnaissance flights (by security aircraft in TG 132.3) to clear itinerant shipping from the predicted cloud passage area out to 800 miles on M minus 2 and K minus 1 days.

(5) Informed the CAA Ninth Region administrator about the possibility of interference with air routes through Wake for short periods of time (a probability concluded by CJTF 132) and made arrangements for closing or modifying these routes on short notice in the event such action became essential.

(6) On the basis of radSAFE advisories from CJTF 132, the Kwajalein-Guam air route was closed from H to H plus 24 hours for MIKE shot only.

(7) For operational reasons as requested by CJTF 132, both Kwajalein and Eniwetok Air Bases were closed for short periods before and after each detonation.

7. Comments on CASTLE Radiological Safety Plan proposed by CJTF 7 (paragraph 2 above)

a. With respect to atomic cloud tracking outside the immediate danger area, the proposal to mount no special effort in this behalf is viewed with concern for the following reasons:

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(1) On the basis of IVY reports received to date, no criterion exists for assuming that significant fall-out hazards from atomic cloud concentrations will arbitrarily limit such possibilities to within the confines of the relatively small danger area now established.

(2) During IVY, almost every atoll and island in the Trust Territory was surveyed by airborne monitoring as described in reference (b) even though negative or insignificant residual radiation was anticipated for the most part. For CASTLE, it is planned to provide the same capabilities established for IVY, but actual monitoring flights will be implemented only in regions where a probability of fall-out is believed to exist. Since the movement of significant radioactive clouds is a major factor in the definition of precise areas where fall-out may possibly occur, it is evident that actual cloud tracking is essential to determine appropriate monitoring flights subsequent to each CASTLE shot. Although it is realized that similar information can be obtained to some degree by cloud trajectory predictions based on meteorological observations and continuous monitoring at fixed stations, such prognostic reports and those limited to predetermined locations will not establish all possible fall-out regions in the Trust Territory. Consequently, it would be necessary to repeat the extensive aerial surveys flown during IVY if cloud tracking beyond the immediate danger area by task force aircraft is discontinued.

(3) During prognostication of special hazards incident to IVY, interference with air routes through Wake was concluded to be a possibility. Although no interference actually resulted from that singular instance, CINCPACFLT has no factual data which would eliminate the possibility of this potential hazard during CASTLE. Therefore, it is considered that cloud tracking is the only positive means of guarding against this hazard with a view toward punctual initiation of appropriate safety measures in the event of its materialization.

(4) CINCPACFLT does not concur with the consideration that the plan proposed in subparagraph 2c(1) above provides a reasonable and safe compromise for the following reasons:

(a) In view of the fact that WB-29 flights will be conducted upwind from the shot site and are for the purpose of forecasting fall-out on the shot site, it is not apparent that this measure will aid in determining conditions in the significant downwind sector (predicted cloud passage area). Conditions in the populated atolls near the upwind sector present least concern since they are situated in a potentially safe region.

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(b) Eniwetok and Bikini (shot sites) are the only populated atolls inside the danger area. Units assigned JTF 7 will be the only forces operating inside the danger area. Since the safety of JTF 7 and the shot sites is the responsibility of CJTF 7, cloud tracking within the danger area will not provide information useful to CINCPACFLT in the discharge of his responsibilities for the safety of other units and populated islands of the Pacific.

b. CINCPACFLT concurs in the plan to sample drinking water only if required by radiological conditions (proposal in subparagraph 2c(2) above). A sampling program of the degree mounted for IVY is not considered necessary for CASTLE.

c. In the formulation of radsafe measures for CASTLE, every effort should be made to eliminate the necessity for evacuation of native populations. The temporary evacuation of Ujelang by a PACFLT vessel during IVY was implemented by CINCPACFLT upon the advice of CJTF 132. In reference (d), CJTF 132 concluded that the existence of a health hazard at Ujelang was a possibility and recommended provision of an evacuation capability. During a preliminary survey of Ujelang to study the situation and make plans, the capability for evacuating natives on short notice was concluded to be impracticable, and a planned orderly evacuation was considered to be the only logical solution. The decision to evacuate Ujelang was predicated not only on reducing health hazards to the indigenes to an acceptable minimum, but also to protect them from possible radiation hazards beyond the shadow of any adverse reflections on the U.S. Government. From the proposals and conclusions in the CASTLE Radsafe Plan (subparagraphs 2a(3), 2b(3), and 2c(3) above), it is apparent that IVY technical and operational experience indicates realistic planning may be based on the premise that no significant health hazards will exist at Ujelang or other populated atolls. Accordingly, it is considered that planning in this respect should include the following basic premises:

(1) The decision to shoot should be reached with the understanding that no health hazards to units and populated islands of the Pacific or radsafe conditions conducive to possible adverse criticism will ensue.

(2) CJTF 7 advisories on appropriate safety precautions incident to CASTLE will not contain conclusions requiring evacuation of populated islands.

(3) In the remote circumstance that extreme post shot conditions develop a necessity for the temporary evacuation of any populated island in the Marshalls, units of JTF 7 would be required to accomplish this emergency measure upon the request of CINCPACFLT.

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d. Advisories issued by CJTF 132 during IVY (paragraph 5, above) were entirely satisfactory and are similarly desired for CASTLE subject to the deletion of unrealistic measures by mutual agreement. Although health hazards of the magnitude surmised for IVY appear unwarranted on the basis of that singular experience, it is considered that any downward revision of the safety measures implemented for IVY should be justified with reference to scientific findings tending to support this current radsafe concept. To determine adequate CASTLE precautions, CINCPACFLT desires recommendations from CJTF 1 which include a full evaluation of measures instituted for IVY as set forth in paragraph 6, above. In such analysis, it should be borne in mind that CINCPACFLT has previously agreed to conduct airborne monitoring (subparagraph 6a(2) above) in cooperation with the Atomic Energy Commission.

e. References (c) and (e) as briefly outlined in paragraph 4. above constitute basic CINCPAC directives issued for Operation IVY. It is contemplated that the basic policies in these references will be retained for CASTLE and reissued as new directives prior to the operation.

f. Prior to IVY, CINCPACFLT requested information on the long range detection program sponsored by the U.S. Air Force Office of Atomic Tests (HQ USAF WASHDC (AFOAT-1) which could be used to advantage in the radiological safety program during the operation. This request further provided for AFOAT-1 to furnish any information that might be obtained on the locations of the clouds from the IVY explosions and the calculated intensity in these clouds. After each IVY shot, AFOAT-1 dispatched radiological reports of various Pacific flights made by aircraft equipped with air filter devices. In general, the intensities recorded were insignificant and these flights reflected no pattern of correlation with the actual atomic cloud tracks. In view of the AFOAT-1 cooperation received for IVY, it is suggested that AFOAT-1 be requested to supplement JTF 7 tracking in order to provide information of a degree essential to CINCPACFLT for the discharge of his responsibilities incident to Pacific safety.

g. Under the proposed radsafe plan, the daily information summaries for the post-shot week (subparagraph 5a(3)(b) above) would be based only on radiological reports from fixed weather stations. Considering the minute number of such stations in relation to the vast expanse of the Pacific area, these reports will not be nearly as reliable as those during IVY and will have no value in areas beyond the vicinity of the weather stations,

h. It is understood that recent developments indicate that only a very small portion of the radioactive energy generated by the MIKE

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detonation has been recorded in the process of continuous fall-out monitoring extrapolated to the present date. As a result, two possible conclusions have been formed. First, residual radioactivity is still scattered above the tropopause. Second, major fall-outs have occurred on the open sea which have gone undetected. To gain more knowledge of the second factor, the AEC proposes to place gumed paper collectors on various naval controlled ships transiting the Pacific during Operation CASTLE. In view of this development, it is considered unwise to place too strong a reliance on the substantial radiological documentation obtained in reference (b).

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s/ H. G. Hopwood  
H. G. HOPWOOD  
Chief of Staff

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