APPENDIX 6
TO
ANNEX A
OPERATIONS PLAN 1-56

RADIOLOGICAL SAFETY OPERATIONS

1. GENERAL: (U)

a. This appendix presents an outline of the Technical Operations to be accomplished by TG 7.4 during on-site operations.

2. RESPONSIBILITIES: (U)

a. The radiological safety of all personnel is a command responsibility.

b. CTG 7.4 will prepare the Air RADEX (plot of radiological exclusion areas) for each shot.

c. The Nuclear Research Officer (NRO) will be responsible for advising CTG 7.4 on all measures necessary to insure the radiological safety of all personnel assigned or attached to TG 7.4. In fulfilling this mission, the NRO will monitor all technical operations relative to TG 7.4.

3. TASKS FOR SUBORDINATE UNITS: (C)

a. The Test Aircraft Unit will be responsible for the radiological safety of all TG 7.4 areas on Eniwetok Island and will:

(1) Provide trained personnel to accomplish all ground radiological monitoring on the airfield at Eniwetok.

(2) Provide trained personnel to accomplish and supervise the removal of gaseous and particulate cloud samples for Projects 11.2, 21.1, and AFOAT-1. (These activities will be monitored by representatives of the project concerned.)

(3) Procure, issue, and maintain all radiac and radiological protective equipment required for TG 7.4 technical operations.

(4) Establish and operate aircraft, equipment, and personnel decontamination centers.

(5) Coordinate with the Commander, Task Unit 7 of TG 7.1 for the issue of all film badges for personnel of TG 7.4 participating in Operation REDWING.

(6) Establish a radiological safety training program to instruct TG 7.4 personnel as radiological monitors. Coordinate the establishment of this course and the preparation of the curricula with other Task Groups or Test Organizations as required.

(7) Support the JTF-7 Sample Return Director and the TG 7.1 Sample Return Coordinator in the transportation of samples from the sample processing compound to the sample return aircraft.

(8) Establish a badge system to control the access of personnel to the Sample Recovery Area, Decontamination area, and other such areas in which a serious radiation hazard is felt to exist. (Request for access to these areas from other than TG 7.4 personnel will be forwarded to CTG 7.4, ATTN: Nuclear Research Officer. The NRO will then forward these requests to the TAU for approval.) (See par 6a(6) this Appendix).

b. The Test Base Unit will:

(1) Provide such normal base functions as are required to support the decontamination operations of TG 7.4 including maintenance of decontamination equipment.

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Date: 30 Aug 94

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(2) Provide fresh water suitable for the decontamination of aircraft.

(3) Provide the necessary helicopter and liaison air service for radiological surveys and post-shot data recovery operations in the Eniwetok area. (Monitor provided by TG 7.1.)

(4) Maintain a Task Group duty roster to provide decontamination crews for the Test Aircraft Unit as required. Such extra duty personnel will be taken from all of the Test Units on a per capita of airmen assigned basis.

c. The TSU will provide cloud tracking aircraft for post-shot rad-safe "situation data" up to a radius of 500 Nautical miles in the significant area for a period of 48 hours starting at approximately H plus 6 hours as required by CJTF-7.

4. SAFETY REGULATIONS: (C)

a. All safety regulations published by the CJTF-7 (See Tab A) or by the CTG 7.4 will be complied with by all personnel assigned or attached for operational purposes to TG 7.4. In the event of conflict with operational requirements, any problems will be referred to the CTG 7.4, ATTN: SWBO, Nuclear Research Officer (NRO).

(1) All military personnel participating in the operation will be physically qualified for general service. All Project 2.66 aircrews will be required to have physical examinations prior to overseas movement and on return to the ZI. Reports of these physical examinations will be submitted in 3 copies to CTG 7.4, ATTN: SWBO (NRO). These reports will consist of a brief statement of any unusual or abnormal results of the physical examination which might disqualify the aircrew member for participation in this or future operations. Negative reports will be submitted. These provisions do not preclude the examination of any individual prior to, during, or after this operation as directed by CTG 7.4.

(2) The arrival or proposed use of radioactive sources in any TG 7.4 controlled area will be reported to the Nuclear Research Officer, TG 7.4.

(3) Contaminated containers for radioactive materials and equipment leaving TG 7.4 areas of the PPG (other than those escorted by courier) will be decontaminated, packaged, monitored, and properly labeled.

(4) All radioactive samples and materials which are removed from Eniwetok by courier aircraft will be packaged and loaded to reduce the radiation intensity on personnel to the minimum. (Refer to Appendix 18) The loads will be cleared from a rad-safe viewpoint by competent authority. The following criteria will determine the loading space requirements:

(a) Prior exposure of aircrew and passengers.

(b) Anticipated future exposure of aircraft personnel.

(c) Length of exposure during flight.

(d) In no case will the crew or passengers be exposed to a dosage rate of 20 mr/hr during flight.

(5) To minimize internal hazards, all personnel handling radioactive samples or contaminated equipment in an enclosed space or under other conditions producing heavily contaminated air will wear respirators.

(6) Eating or smoking in a contaminated area or when working with contaminated materials is forbidden.

(7) The total permissible integrated dose of gamma radiation for personnel involved in this operation will be 3.9 r for each 13 week period of the operation, (the first period commencing 15 April 1956) unless otherwise specified by proper authority. (See Tab A)

5. TRAINING: (C)

a. Personnel designated as radiological monitors will be trained and qualified in compliance with existing Air Force Technical Orders and Regulations. Personnel trained in an approved course prior to overseas movement will be considered qualified. The qualification of previously trained monitors, however, will be subject to review and approval by the NRO, TG 7.4. All other individuals designated as monitors will be trained in the rad-safe monitors course to be presented at Eniwetok by the TAU.

b. Each Project Officer or Test Unit Commander will insure that all participating personnel are briefed, prior to the test, on the general and specific radiological problems involved in their operations. They will also insure that their personnel are kept abreast of any changes in their radiological problems that occur during the test series.

(1) Each Project Officer or Test Unit Commander concerned with Test or Post-Test missions involving multi-engine aircraft (except, as in the case of certain B-57's, when such aircraft is manned only by the pilot) will insure that at least one crew member of each such aircraft is trained and qualified as a radiological monitor.

(2) The Commander, TSU will insure that certain personnel on the weather islands are trained and qualified as radiological monitors as follows:

(a) Rongerik - At least 3 monitors assigned at all times.

(b) Other weather islands - At least 1 monitor assigned at all times.

6. PROCEDURES: (C)

a. Special detailed operating procedures for the implementation of the above will be prepared by the Test Unit responsible. Copies of these SOP's will be forwarded to the CTG 7.4, ATTN: SWBO, NRO prior to 1 April 1956.

(1) The Commander, TAU will submit SOP's on the following operations:

(a) Aircraft decontamination.

(b) Personnel dosimetry and decontamination, including issue, control, and recording film badges.

(c) Sample recovery, including instructions for the recovery of samples from sampler aircraft diverted in an emergency to JANET, NAN, PETER-OBOE, or Kwajalein. (Refer to Appendix 18, Annex C)

(d) Issue and maintenance of radiac instruments.

(e) Radiological monitoring services.

(f) Radiation hazard area access badge system.

TABS:

A. Radiological Safety Operations

B. Radiological Safety SOP for Weather Islands

C. Flash Blindness

D. Radiological Contamination Procedures

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CJTF-7 RADIOLOGICAL SAFETY REGULATIONS

Appendix 1 To Annex K
CJTF-7 RADIOLOGICAL SAFETY REGULATIONS

The following Rad-Safe Policy, is quoted for the information and guidance of all TG 7.4 personnel. It may be de-classified if all reference to CJTF-7, TG 7.4 and other task organizations are eliminated, so that it may be given wide distribution.

"1. GENERAL: (C)

a. Radiological Defense (Rad Defense) Operations or Radiological Safety (Rad Safe) operations, short term RadOps, are general terms. They are used to denote the means by which a unit can control and confine the damage and radiological effects of an atomic explosion or of radioactive material spread by other means, thereby preventing and avoiding health hazards to personnel. They are interpreted to include measures such as training, organization, distribution of radiological personnel, development of techniques and procedures, use of detecting equipment, protection or removal of exposed personnel and decontamination of personnel, structures and equipment.

b. Following each detonation there will be areas of surface radiological contamination and areas of air radiological contamination. These areas are designated as Radiological Exclusion Areas (RADEX). Prior to shot times, the forecast air and surface RADEX will be disseminated by CJTF-7 in the target area. These RADEXES will represent a forecast from H-Hour until dissemination of a later surface and air RADEX at about H plus 6 hours. The later RADEXES will be based upon the master radiological "situation map" maintained in the Rad-Safe Office of CJTF-7. Since the air RADEX after shot times will be based on monitored tracking by aircraft over significantly large ocean areas, information from the forecast air RADEX may have to be extended beyond the originally anticipated 6 hour period.

c. The surface RADEX will be determined by actual survey with Radiation Detection, Indication and Computation (RADIAC) equipment after shot time. The most rapid method of accomplishing surface surveys in the early stages will be by aircraft and helicopter flight in and around the surface of contaminated areas. From the radiation intensities measured at a known altitude, it is possible to obtain an estimate of radiation dosage rates which would be encountered on the surface of the ground or water. Actual water samples from the lagoon will also be utilized. Surface survey will follow these guides to determine definitely the contaminated regions and objects. Formal ground survey of the shot atoll, if feasible, will be accomplished on H plus 24 hours".

"2. The Maximum Permissible Exposures (MPE's) and Maximum Permissible Limits (MPL's) as stated herein are applicable to a field experimental test of nuclear devices in peacetime wherein numbers of personnel engaged in these tests have been previously exposed or will be continuously exposed to potential radiation hazards. It may become necessary from a study of personnel records to reduce the MPE for certain individuals who have recently been over-exposed to radiation. Further, the MPE's and MPL's are subject to revision by the Task Force Commander in individually designated cases when circumstances indicate the need and justification therefor". (C)

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"3. Due to the special nature of field tests it is considered that a policy of strict adherence to the radiological standards prescribed for routine work is not realistic. The regulations set forth herein have been designed as a reasonable and safe compromise considering conservation of personnel exposures, the international import of the test and the cost aspects of operational delays chargeable to excessive radiological precautions. In all cases, other than emergencies or tactical situations, the ultimate criteria will be limited by the MPE's for personnel. Special instances may arise such as in the case of an air-sea rescue within the RADEX or in the case of tactical situation in which operations will be carried out without regard to the MPE's and MPL's prescribed herein. For such emergency or tactical operations, the criteria prescribed below for tactical situations will be used as a guide. Wherever possible, however, film badges will be carried and RadSafe monitors will accompany such operations to determine the extent of the actual radiation hazard experienced in order that appropriate medical action may be initiated." (C)

"4. Task Force radiation dosage control will start on first shot ready date minus 15 days and terminate upon departure of individuals from the forward area, or on the last shot plus 15 days, whichever occurs first. All personnel will be considered to have arrived at the PPG by first shot ready date minus 15 days. Prior and subsequent to this period, radiation dosage control will be as prescribed by CTG 7.5." (C)

"5. a. The MPE for personnel involved in this operation is 3.9 roentgens (gamma only) per 13-week period. This exposure may be acquired without limitation on rate of exposure - an individual exposure record should not indicate a total exposure greater than 3.9 roentgens for any given 13-week period.

b. A special MPE to be determined later will be authorized for the operational period as defined by paragraph 4. above, for crew members of air sampling and early penetration (2.66) aircraft.

c. Authorization for individual exposures in excess of the established MPE will be granted only by CJTF-7, and only in specific cases for which operational requirements provide justification.

d. All exposure to external gamma radiation will be regarded as total body irradiation." (C)

"6. Those individuals exposed to ionizing radiation in excess of the value computed by paragraph 5.a., above, will be informed that appropriate remarks will be included in their medical records. Military personnel in this category will be advised that they should not be exposed to further radiation until sufficient time has elapsed in order to bring their average radiation dose down to 0.3 roentgens per week. Civilian personnel in this category will be informed that limitations on further radiation exposure will be as determined by the laboratory or agency having administrative jurisdiction over such personnel." (C)

"7. All atoll land and lagoon areas in or near which a detonation takes place will be considered contaminated until cleared for operations by the CJTF-7. Entry to and exit from contaminated areas will be via RadSafe check points only." (C)

"8. Contaminated land and water areas will be delineated as such. Personnel entering these areas will be subject to clearances by the RadSafe Office, TG 7.1, and will normally be accompanied by RadSafe monitor. RadSafe clothing and equipment will be issued to the personnel.

"9. Contaminated land areas of intensities less than 10 mr/hr (gamma only) will be considered unrestricted from a RadSafe standpoint. Areas coming within this limitation will be designated specifically by CJTF-7 prior to unrestricted entry." (C)

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"10. RadSafe monitors assigned to individuals or groups working in contaminated areas or with contaminated equipment during recovery operations will act in an advisory capacity to keep the recovery party leader informed of radiation intensities at all times. The recovery party leader is expected to accept this advice and act accordingly. It is the responsibility of both the leader and the members of the recovery party to adhere to the limits established in these regulations." (U)

"11. Film badges, dosimeters and protective clothing (coveralls, booties, caps, gloves, dust respirators, etc) as deemed necessary will be issued to personnel entering contaminated areas by appropriate task group RadSafe supply sections. All personnel dosage film badges will be procured from and returned to the laboratory of TU-7, TG 7.1 where all processing and recording will be accomplished." (C)

"12. All personnel within viewing distance of an atomic detonation who are not supplied with protective goggles will turn away from the detonation point and close their eyes during the time of burst. At least ten seconds should be allowed before looking directly at the burst. See TAB C for specific aircrew action to prevent flash blindness." (U)

"13. The arrival and proposed use of all radioactive sources at the Pacific Proving Ground will be reported to the RadSafe Officer of TG 7.1." (C)

"14. Transportation of radioactive materiel to and from the forward area shall be in accordance with AEC regulations for escorted shipment of such material. The assignment of couriers and RadSafe monitors will be the subject of separate instructions. No radioactive material shall be removed from the test site except as authorized in experimental projects." (C)

"15. All samples of radioactive material which are couriered in aircraft will be packaged and loaded so as to reduce radiation to a minimum. Prior to departure of such aircraft, the RadSafe Officer, TG 7.4 will have a survey made of the aircraft cargo to determine if adequate precautions have been taken. The following criteria will determine space and packaging requirements: (C)

a. Prior exposure of aircraft crew, courier and passengers.

b. Anticipated future exposures on trip, considering length of trip, compartmental loading requirements and capability to isolate personnel from radioactive material."

"16. All air and surface vehicles or craft used in contaminated areas will be checked through the appropriate task group decontamination section upon return from such areas." (U)

"17. The MPL's listed herein are to be regarded as advisory limits for control under average conditions. All readings of surface contamination are to be made with Geiger counters, with tube walls not substantially in excess of 30 mg/cm^2 with shield open unless otherwise specified. The surface of the probe should be held to one inch to two inches from the surface that is under observation unless otherwise specified. For operational purposes the contamination MPL's presented below will not be considered applicable to spotty contamination provided such areas can be effectively isolated from personnel." (U)

a. <u>Personnel and Clothing MPL's</u>: (U)

(1) Skin readings should not be more than 1.0 mr/hr. Complete decontamination by bathing will be utilized for readings in excess of this level. If the body is generally contaminated and especially if contamination is on the eyes or gonads, special efforts should be made to reduce the contamination level. In general, however, it is not considered profitable to excessively scrub the skin or scalp in an attempt to reduce stubborn contamination below 1 mr/hr (about 1000 cpm). Beta radiation exposure to the hands should not exceed 30.0 rep for the operational period, as defined in paragraph 4 above.

(2) Underclothing and body equipment such as the internal surfaces of respirators should be reduced to 2 mr/hr.

(3) Outer clothing should be reduced to 7 mr/hr.

b. Vehicle MPL's. The interior surfaces of occupied sections of vehicles should be reduced to 7 mr/hr. The outside surfaces of vehicles should be reduced to less then 7 mr/hr (gamma only) at five or six inches from the surface.

c. Ships and Boat MPL's: (U)

(1) It is desired to point out that the employment of the ships and units in TG 7.3, insofar as radiological safety is concerned, is not considered routine usage within the purview of NavMed P-1325, "Radiological Safety Regulations." Current revision of NavMed P-1325 indicates that its provisions do not apply for special operations such as field tests and that for such operations naval personnel will operate under regulations set forth by CJTF-7 as approved by the Chief of Naval Operations.

(2) In general, ships and boats operating in waters near shot sites after shot times may become contaminated. Monitors shall be aboard all such craft operating after shot time, either as passengers or members of the crew, until such time as radiological restrictions are lifted.

(3) Task group commanders will take necessary action to ensure that personnel of ships and boats are not over-exposed to radiation and that ships and boats are not contaminated excessively. The criterion in both cases is that no personnel will be over-exposed as defined by paragraph 4.a., above, except in emergencies or tactical operations, and that after the operational period no personnel will receive more than 0.3 roentgens per week from contaminated equipment.

(4) For ships and boats operating in contaminated waters, reasonable allowances will be made to differentiate between the relative contribution so the total flux from fixed contamination and that due to "shine" from contaminated waters. Fixed alpha contamination should not exceed 2500 dpm (disintegrations per minute) per 150 cm^2 of area for enclosed areas (cabins, etc.) and 500 dpm per 150 cm^2 area for open surfaces where ventilation is good.

(5) At the conclusion of the operation, final clearances will be granted to Task Group Commanders, or by commanding officers if so ordered, to those ships and boats showing no point of contamination greater than 15 mr/day (betta and gamma) and no detectable alpha. Other ships and boats will be granted operational clearances by Task Group Commanders, or by commanding officers if so ordered. An operational clearance implies that contamination exists and that special procedures as necessary are instituted aboard ship.

(6) Individuals on board ships of the Task Force shall be protected collectively from hazards of blast, heat and radioactivity by movement and positioning of ships.

(7) Ships with personnel aboard shall not be permitted inside the 1.5 p.s.i. line unless specifically directed otherwise. Bearings of danger from immediate radioactive fallout for ship operations will be established by CJTF-7 on the basis of forecast wind directions at the intended time of detonation. This danger section will be designated as surface RADEX. All ships of the Task Force shall be required to remain outside the RADEX, unless specifically directed otherwise. However, if ships are directed tactically into the surface RADEX, movement of ships shall be governed by tactical exposure guides.

d. Aircraft MPL's: (U)

(1) The interior surfaces of occupied sections of aircraft should be reduced to 7 mr/hr.

(2) No aircraft in the air at H-Hour will be at slant ranges from ground zero less than as determined by the following effects unless specifically directed otherwise. (Based on maximum predicted yield and 20 mile visibility).

Blast (at predicted shock arrival): 0.5 p.s.i.

Thermal (H-Hour): Fabric control surfaces: 1.0 cal/cm^2

Metal control surfaces: 6.0 cal/cm^2

(3) After detonation no aircraft shall operate inside the air RADEX, or closer than 10 nautical miles from the rising or visible cloud, unless specifically directed otherwise. Non-excepted aircraft involved in routine operations encountering unexpected regions of aerial contamination will execute a turnout immediately upon detecting such contamination. Cloud tracking aircraft will execute turnout from contaminated areas at a level of not more than 3.0 r/hr. If a tactical or emergency situation arises where aircraft must enter the air RADEX or visible cloud, tactical exposure allowances shall apply.

(4) All multi-engine task force aircraft in the air at H-Hour within 100 miles of the detonation point shall carry a person designated as radiological safety monitor, equipped with suitable radiac equipment, and a RADEX plot. This monitor shall be capable of calculating allowable exposures under both tactical and operational conditions.

(5) All persons in aircraft at shot time, or at subsequent times, shall wear film badges when engaged in operations in or near the cloud or RADEX track.

(6) Crew members of aircraft in the air at H-Hour will take special precautions to avoid (for at least 10 seconds) the direct and reflected light resulting from the burst. (See TAB C).

e. In air and water, the following continuous levels of radioactivity are considered safe from the standpoint of personnel drinking and breathing (uc-microcurie):

	Beta-Gamma Emitter
Water	5×10^{-3} uc/cc (Calculated to H + 3 days)

Air (24 hour average)

Particles less than 5 micron diameter 10^{-6} uc/cc

Particles greater than 5 micron diameter 10^{-4} uc/cc"

"18. In tactical situations the military commander must make the decision regarding allowable exposures. As military personnel are normally subject to only random exposure, health hazards are at a minimum. Current Department of Defense information on exposure to gamma radiation in tactical situations is indicated below: (U)

a. Uniform acute (immediate) exposure of 50 roentgens to a group of Armed Forces personnel will not appreciably affect their efficiency as a fighting unit.

b. Uniform acute exposure of 100 roentgens will produce, in occasional individuals, nausea and vomiting but not to an extent that will render Armed Forces personnel ineffective as fighting units. Personnel receiving an acute radiation exposure of 100 or more roentgens should be given a period of rest and individual evaluation as soon as possible.

c. Uniform acute exposure of approximately 150 roentgens or greater can be expected to render Armed Forces personnel ineffective as troops within a few hours through a substantial incidence of nausea, vomiting, weakness and prostration. Mortality produced by an acute exposure of 150 roentgens will be very low and eventual recovery of physical fitness may be expected.

d. Field Commands should, therefore, assume that if substantial numbers of their men receive acute radiation exposures substantially above 100 roentgens there is a grave risk that their commands will rapidly become ineffective as fighting units.

e. Internal radiation hazards caused by entry of radioactive substances through the mouth, through the lungs, or through cuts or wounds do not exist after an air burst. Internal hazards following a contaminating surface explosion may be avoided if ordinary precautions are taken. Only under unusual circumstances will there be internal hazard from residual contamination. This eliminates the necessity for masking and consequent reduction of tactical efficiency."

"19. The RadSafe Officer, TG 7.1 will maintain standard-type film badge records of radiation exposures for all task force personnel. Records will indicate full name, rank or rate, serial or service number, if applicable, organization, home station or laboratory, date of exposure, approximate duration of over-exposure in hours and minutes (for Army personnel only) and remarks such as limitations on assignment because of over-exposure. Upon completion of the operation, disposition of these records will be as follows: (C)

a. A consolidated list of exposures listing military personnel, and civilian personnel under military control, by full name, rank, or rate, serial or service number (if applicable), organization, home station or laboratory and exposure in milliroentgens, together with exposed film badges and control film badges, will be forwarded to the Chief, AFSWP.

b. A consolidated list of personnel and exposures, as indicated in paragraph 19a., above, including all AEC personnel, will be forwarded to the Director, Division of Biology and Medicine, AEC.

c. Individual records of Navy and Air Force military and civilian personnel will be forwarded to their unit of permanent assignment for inclusion in the individual's health record (Medical History Sheets, Standard Form 600 and the Individual Health Record for Navy and Air Force personnel, respectively.) For those military personnel exposed to ionizing radiation in excess of that defined in paragraph 5a., above, a statement will be included to the effect that the individual is not to be subjected to ionizing radiation before a specific date, the date to be computed by the RadSafe Officer, TG 7.1, to allow sufficient time to elapse in order to bring the average radiation dose down to 0.3 roentgens per week. Limitations on Navy and Air Force civilian personnel with reference to over-exposure will be as determined by the laboratory or agency having administrative jurisdiction over such personnel.

d. Individual records of Army military and civilian personnel will be forwarded in accordance with AR 40-414 dated 16 December 1954 to their unit of permanent assignment for inclusion in the individual's field military 201 file or the civilian personnel 201 file (whichever is applicable). These records will indicate date of exposure, amount of exposure in milliroentgens, approximate duration of over-exposure in hours and minutes and a space for remarks such as limitations on assignment (as indicated in paragraph 19c., above) because of over-exposures.

e. Individual records of AEC controlled and administered civilian personnel will be processed in accordance with special instructions prescribed by the laboratory or agency having administrative jurisdiction over such personnel.

f. Upon completion of provisions of paragraph 19a., b., c., d., and e., above, letter reports will be submitted through channels to the Surgeon General, USA; the Chief, Bureau of Medicine and Surgery, USN; the Surgeon General, USAF and the Director, Division of Biology and Medicine, AEC, indicating, in general, the action taken to dispose of individual dose records, comments on over-exposures if applicable and any pertinent remarks considered of interest to the above offices."

"20. Training:

a. The inclusion or radiological safety organizations throughout the Task Force will require two general levels of training; basic indoctrination and technical training. The scope of instruction within each of these levels will vary in accordance with the requirements of different operational and staff levels. Basic indoctrination will include primary, non-technical instruction in radiological safety measures and techniques. This must be imparted to all personnel of the Task Force to enable them to perform their assigned duties efficiently within the allowable low exposures, regardless of the presence of radioactive contaminants. Technical training will include the training of the majority of the personnel who will be required to staff the Task Force radiological safety organizations and perform the technical operations involved. This will be accomplished through the utilization of existing Service courses and establishment of suitable courses at task group level. This instruction will be designed to train radiological defense monitors, decontamination personnel and radiological instrument repairmen."

"21. These regulations have the concurrence of the Surgeon General, USA; the Chief of Naval Operations; the Surgeon General, USAF and the Director, Division of Biology and Medicine, AEC." (U)

"22. This appendix has been designed for reduced security classification in order to facilitate wide dissemination and may be downgraded to UNCLASSIFIED provided all references to JTF-7 and its subordinate units are deleted." (U)

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RADIOLOGICAL SAFETY SOP FOR WEATHER ISLANDS

1. GENERAL: (U)

a. This SOP is prepared to provide standardized guidance for the various weather island detachments.

2. RESPONSIBILITIES: (C)

a. It is the responsibility of the Commander, TSU to insure that an adequate number of personnel from each weather island are properly trained as radiological monitors.

b. The Commander, TAU will make available to the weather island detachments the required radiac instruments and will provide maintenance of these instruments as follows:

(1) "Proteximeters" AN/PDR-2 (if available) - one instrument for Rongerik.

(2) AN/PDR-39 - a minimum of two instruments each for Kussie, Kapingamarangi, and Tarawa. A minimum of four instruments for Rongerik.

(3) AN/PDR-27a or AN/PDR-27c - a minimum of two instruments for Kusaie, Kapingamarangi, and Tarawa. A minimum of four instruments for Rongerik.

(4) A minimum of two side window Geiger-Meuller instruments for Rongerik.

(5) The above instruments will be exchanged bi-weekly or as required, by means of the weather island re-supply flights, and returned to Eniwetok for maintenance.

3. PROCEDURES: (C)

a. Rongerik: Following a Bikini shot or large yield Eniwetok shot the weather detachment will:

(1) Monitor the readings of the automatic recording dosage device ("automonitor") which will be provided.

(2) Monitor the accumulated dosage reading on the "Proteximeter."

(3) Periodically monitor the island (equipment, buildings, etc.) utilizing the G-M type instruments to determine any significant increase over background radiation. If G-M readings go off scale, use ionization chamber PDR-39's.

(4) Submit a radiation level report to the CJTF-7 every twelve hours and to the CTG 7.4 at intervals of six hours, starting at H + 6 hours provided the radiation level is less than 5 mr/hr.

(5) Immediately report to the CJTF-7 and CTG 7.4 any abrupt increases in radiation dosage levels or if the radiation dosage level rises above 10 mr/hr, as indicated by the instruments in (1) and (3) above. Report each increment of 10 mr/hr, unless otherwise directed.

(6) If the radiation level increases above 10 mr/hr and no instructions have been received from CJTF-7 or CTG 7.4, implement Radiological Defense Plan "B" or "C" as required. (Refer to Appendix 6, Tab D) If severe late contamination 5 r/hr or above is encountered (see above reference) and no instructions have been received, the weather island Commander will direct all personnel to immerse themselves in the lagoon up to their necks and periodically immerse their heads to rinse off any fallout particles.

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b. Other Weather Islands: The other weather islands will, in general, observe the procedures outlined in "a" above. They will report radiation levels at intervals of twelve hours, beginning at H + 12 hours unless otherwise directed.

c. All weather islands will conduct daily radiological surveys beginning on the first shot day minus one, and report any unusual increases over background radiation to the CJTF-7 and the CTG 7.4.

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FLASH BLINDNESS

1. GENERAL: (U)

a. The flash from a nuclear explosion is many times brighter than the sun. Flash blindness of even very short duration may reduce the operational ability of an aircraft pilot or aircrew member to a level detrimental to safe operation of the aircraft. With large numbers of aircraft operating above the PPG, any individual aircraft deviation from its course for a matter of only a few seconds could create an extremely hazardous situation. It is therefore imperative to establish procedures to prevent flash blindness from impairing the operational efficiency of any aircraft participating in this operation. (See Tab A, par 17,d, (6).)

2. PROCEDURES AND INSTRUCTIONS: (C)

a. No one will look at the fireball with a naked eye at any time.

b. No one will look at the fireball through any optical system - bombsights, etc.

c. Ground and air observers wishing to look at the fireball will use 4.5 neutral density goggles.

d. Ground and air observers without 4.5 density goggles will cover their eyes with the arm and turn their heads away (180°) from the detonation point from 2 seconds prior to detonation until detonation plus 10 seconds.

e. For multi-engines aircraft crews, the following action is recommended:

(1) The copilot (or pilot) will either wear 4.5 neutral density goggles or duck his head in the cockpit and cover his eyes with his hands for the period from minus 2 seconds to plus 10 seconds.

(2) The pilot (or co-pilot) flying the aircraft will keep his head down in the cockpit and his eyes on the instruments during the period minus 2 seconds to plus 10 seconds.

f. Single-place aircraft: It is recommended that the pilot keep his head low in the cockpit and his eyes on the instruments during the period from minus 1 second to plus 10 seconds.

g. All aircraft: It is recommended that, if possible, all aircraft within 20 miles horizontal distance of ground zero be provided with thermal curtains.

h. General recommendations:

(1) If available, bright floodlights be turned on the instrument panel prior to detonation. (This is not sufficient by itself.)

(2) Crewman without 4.5 neutral density goggles wear the issue sun glasses before and during the detonation. (Do not look at the fireball.)

(3) Rear view mirrors or similar flat reflecting surfaces facing rearward on fighter-type aircraft be taped.

i. 4.5 neutral density goggles will be issued by TG 7.4 only to personnel staging from and returning to Eniwetok Island. Goggles will be obtained from the Personal Equipment Section of the Test Aircraft Unit.

TAB C, AP 6, AN A
OPERATIONS PLAN 1-56
TASK GROUP 7.4 (PROV)

TAB D
TO
APPENDIX 6
TO
ANNEX A
OPERATIONS PLAN 1-56

RADIOLOGICAL CONTAMINATION PROCEDURES

1. GENERAL: (C)

a. This SOP will govern the actions of all individuals of TG 7.4 in the event of an accidental radiological contamination of Eniwetok Island or one of the Weather Islands. It is of paramount importance that directions given under the provisions of this SOP be followed expeditiously and accurately since wasted time adds to the hazard by unnecessary prolonged exposure to nuclear radiation. In view of the precautions to be taken to avoid an accidental radiological contamination of the island of Eniwetok, including the reporting of radiation intensities within the Eniwetok-Bikini area by all aircraft flying within this region, it is highly improbable that an accidental contamination could occur with less than six hours advance warning. This time will be utilized to notify personnel to prepare for implementation of any of the several procedures outlined below. The provisions of this Tab will apply to all areas under the operational control of CTG 7.4.

2. DEFINITIONS: (S)

a. Early Contamination: Contamination of the affected island occurring within 12 hours subsequent to shot time.

b. Late Contamination: Contamination of the affected island occurring after 12 hours subsequent to shot time.

c. Severe Contamination: Contamination of at least half the land area of the affected island with a gamma field of an intensity greater than 1 R/hr, as measured at a distance of 3-4 feet from the contaminated surface by a Geiger-Mueller type radiac instrument.

d. Moderate Contamination: Contamination of at least half the land area of the affected island with a gamma field of an intensity greater than 100 MR/hr but not more than 1 R/hr measured as indicated in c above.

e. Light Contamination: Contamination of at least half the land area of the affected island with a gamma field of an intensity greater than 10 MR/hr but not more than 100 MR/hr measured as indicated in c above.

f. Local Contamination: Contamination of small areas, by gamma fields of any intensity, will be treated according to the normal rad-safe practices of isolation and marking.

g. Radiological Defense Plan "A": A plan whereby all personnel are physically evacuated from Eniwetok Island in accordance with the procedures established. (See Tab A, Appendix 8, Annex A)

h. Radiological Defense Plan "B": A plan whereby all personnel are gathered within those buildings most likely to shield the occupants from radiation.

i. Radiological Defense Plan "C": A plan whereby all essential activities continue but all unessential activities cease and personnel so engaged are gathered within those buildings most likely to afford protection from nuclear radiation.

3. PROCEDURES: (S)

a. All reports of radiation intensities encountered in flight within the Bikini-Eniwetok area are received in the Air Operations Center on Eniwetok Island. These reports are evaluated by the Air Task Group

Nuclear Research Officer and forwarded to CJTF-7. Upon realization that an accidental radiological contamination of Eniwetok Island or one of the Weather Islands is possible, the Nuclear Research Officer will immediately notify CTG 7.4. At the same time he will also notify the Commanders of subordinate Task Units of the anticipated level of contamination by telephone.

b. Upon receiving this notification, the Commanders, Test Aircraft and Test Base Units will direct their nuclear applications section Commanders to prepare for implementation of whichever radiological defense plan is applicable.

c. Selection of appropriate radiological defense plan will be governed by the following considerations:

(1) Radiological defense plan "A" - to be used in the event of late, severe contamination.

(2) Radiological defense plan "B" - to be used in the event of early, severe contamination and late, moderate contamination.

(3) Radiological defense plan "C" - to be used in the event of early, moderate contamination or late, light contamination.

d. Detailed procedures to be followed for each radiological defense plan are:

(1) Radiological defense plan "A":

(a) When directed by Task Force Commander, evacuation of Eniwetok Island will be initiated.

(b) Evacuation procedures will be the same as those outlined in Tab A, Appendix 8, Annex A.

(c) Prior to return, airborne radiation surveys will be conducted as necessary to insure that radiation intensities have diminished to a safe level for the return of personnel to the island.

(2) Radiological defense plan "B":

(a) The Fire Warden of each individual building will be advised by the radiation monitor assigned to that building to gather all personnel for which he is responsible into the buildings most likely to afford protection to the occupants from nuclear radiation. These buildings assignments will be made shortly after arrival in the forward area.

(b) Radiation monitors, with necessary radiac equipment will take up pre-arranged posts and will monitor levels of radiation. Reports will be made of the radiation intensity each quarter hour to the Air Operations Center by telephone or radio. Weather Island monitors will report hourly.

(c) When it appears that the level of radiation has diminished to the level of radiological defense plan "C", all radiation monitors will be so advised by the Air Task Group Nuclear Research Officer.

(d) Radiation monitors will then advise fire wardens of buildings within their control to put radiological defense plan "C" into effect.

(3) Radiological Defense Plan "C":

(a) As in 2a the fire warden of each building will be advised to gather his most non-essential workers, which will be specifically designated by section heads within the same buildings designated in 2a.

(b) As in 2b radiation monitors will assume assigned posts and will report radiation intensities each quarter hour to the Air Operations Center. In the case of Weather Island monitors, reports will be submitted each 2 hours.

(c) When the radiation intensities diminish to a level below that specified for radiological defense plan "C", all radiation monitors will be advised by the Air Task Group Nuclear Research Officer.

(d) Radiation monitors will then advise fire wardens to have personnel return to work.

4. RESPONSIBILITIES: (C)

a. The Air Task Group Nuclear Research Officer will:

(1) Advise the Air Task Group Commander and Commanders of subordinate Task Units of the possibility of radiological contamination of Eniwetok Island.

(2) Maintain a current radiological contamination status board in the Air Operations Center.

(3) Receive and evaluate reports submitted by radiation monitors.

(4) Coordinate with JTF-7 Rad-Safe Organization to determine when the hazard from nuclear radiation no longer exists and advise radiation monitors upon decision by Air Task Group Commander that radiological defense plan will be lifted.

b. Commanders of subordinate Air Task Units will direct implementation of appropriate radiological defense plan upon notification by Air Task Group Nuclear Research Officer.

c. Radiation monitors will:

(1) Obtain required radiac equipment upon direction by Nuclear Applications Section Commander and report to assigned post.

(2) Notify fire wardens of assigned buildings of radiological defense plan to be put into effect.

(3) Report radiation intensities each quarter hour to the Air Task Group Nuclear Research Officer at the Air Operations Center except as otherwise indicated. This report will be made by telephone or radio.

(4) When advised by TG 7.4, advise fire wardens to lift radiological defense plan.

d. Fire Wardens will:

(1) Upon notification by radiation monitors, direct personnel to assigned shelters.

(2) Upon further notification by radiation monitors, direct personnel to return to duty.

TAB D, AP 6, AN A
OPERATIONS PLAN 1-56
TASK GROUP 7.4 (PROV)

20 APRIL 1956

TASK ORGANIZATIONS:

a. Hq, T.G. 7.4

b. Hq, TBU

c. Hq, TAU

d. Hq, TSU

1. SITUATION:

a. There is a possibility that certain of the Northern Marshall Islands including Eniwetok could receive fall-out from radioactive clouds drifting near or over the islands. If the activity is sufficiently great it may be necessary to evacuate aircraft and personnel.

b. In some instances it may become necessary to evacuate only a few aircraft, the flight and maintenance crews of these aircraft and personnel who have accumlated certain radiation dosages. In other instances it may be desirable to fill the remaining spaces on the evacuation aircraft with passenger loads comprised of specialists to support the aircraft and personnel requirements at the evacuation station. In extreme instances, total evacuation may become necessary and those personnel not evacuated by air would have to be evacuated by surface vessel.

c. Assumptions: That any condition of radioactive fall-out alert will require immediate accounting of all T.G. 7.4 personnel and assignment to emergency shelter prior to possible evacuation.

2. MISSION:

a. To provide maximum protection for personnel and property in the event of radioactive fall-out on Eniwetok or adjacent weather and project islands. This will be accomplished through coordination with CTG 7.2; through indoctrination of all personnel assigned to T.G. 7.4; and preparation of complete and workable emergency plans by this Headquarters and subordinate units.

3. RADIATION CATEGORIES:

a. Category I: Individuals who expect to enter shot areas or radioactive clouds on subsequent events of this test series, or personnel whose current radiation dosage exceeds 3.5 roentgens. Included in this category are all sampler pilots and observers, all Project 2.66 aircrews and all helicopter and L-20 aircrews under the jurisdiction of CTG 7.4.

b. Category II: Individuals who normally will not be expected to enter radioactive contaminated areas on events of the test series provided their current accumlative radiation dosage is less than 3.5 roentgens.

4. TASKS FOR Hq, T.G. 7.4:

a. Prepare a detailed emergency plan for protection and/or evacuation of Hq, T.G. 7.4 personnel and/or critical equipment.

b. Appoint an Evacuation Officer to represent CTG 7.4 in monitoring emergency plans of subordinate units and a Muster Officer to exercise accountability of all personnel assigned to T.G. 7.4.

c. Provide for allocation and priority assignment of space aboard evacuation aircraft and surface vessels for all T.G. 7.4 personnel with exception of minimum flight and maintenance crews to be assigned by the D/O,

Declassified By DNA, Chief, ISTS
John L. Bailey Sr.
Date: 30 Aug 94
pages 1 thru 6 only.

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5. TASKS FOR PARTICIPATING ORGANIZATIONS:

a. Test Base Unit:

(1) Is responsible upon the execution of this plan for the evacuation of transient and assigned C-47 aircraft. At the time alert notification is received, CTG 7.4 will be advised of the number and type of transient aircraft present, together with their airlift capability. In the case of MATS aircraft coordination will be affected with CTSU.

(2) Be prepared to evacuate personnel from sites within Eniwetok Atoll by L-20 and H-19 aircraft. Aircrew personnel of such aircraft will be allowed to exceed the established radiation dosage of 3.5 roentgens depending upon the urgency of the mission as established by CJTF-7 thru CTG 7.4 at the time. In all cases the dosage of such personnel will be continuously monitored and they will be given priority for immediate departure by air upon the decision of CTG 7.4.

(3) Coordinate with Comdr, TSU in preparation for the evacuation of Project and Weather Islands to either Eniwetok or those evacuation bases listed in Annex D for SA-16 type aircraft. The Project and Weather Islands include Bikini, Kapingamarangi, Kusaie, Tarawa, Rongerik, Ailinginae, Utirik, Ujelang and Wotho.

(4) Be prepared to assist in SAR requirements as directed.

(5) Prepare for the "phasing out" of personnel required for priority facilities such as the Control Tower, fire and crash crews, etc.

(6) Prepare for storage of L-20 and H-19 aircraft in Building #118 (hanger) or for surface vessel evacuation of H-19 aircraft as directed by CTG 7.4.

b. Test Services Unit:

(1) Will, upon execution of this plan, be responsible for the preparation and evacuation of TSU aircraft.

(2) Prepare for possible evacuation of Project and Weather Islands as referred to in paragraph a(3), above.

(a) The prevelent wind structure in this area of the Pacific Ocean dictates that of the eight (8) Project and Weather Islands, Rongerik, Wotho, Ailinginae and Utirik are most likely to receive radiation fall-out of sufficient intensity to warrant evacuation. (Bikini will already be evacuated for all Bikini shots).

(3) Upon notification to evacuate, provide one C-54 aircraft to be parked on the MATS ramp adjacent to Base Operations. The last available minimum flight and maintenance crew will be assigned to stand by in this aircraft. It will be utilized to evacuate all Category II personnel remaining on Eniwetok at the decision of CTG 7.4 to cease operations and will proceed to Kwajalein or Guam where the TG 7.4 evacuation command post will be set up.

(4) Appoint a Passenger Control Officer who will be responsible for processing passengers to evacuation aircraft. This officer will be located in Building #118 (hangar), designated as the

advised of aircraft status and loading during the evacuation.

c. Test Aircraft Unit:

(1) Will, upon execution of this plan, be responsible for the preparation and evacuation of TAU aircraft.

(2) Be responsible for the briefing of all aerial evacuation crews in Building #679 prior to their departure. This will include an appropriate weather briefing.

(3) Personnel Dosimetry Section:

(a) Maintain a current file of radiation dosage for all personnel assigned to T.G. 7.4.

(b) Submit to the Test Unit Commanders and to the Adjutant T.G. 7.4, rosters of all personnel in their units who have received and who are expected to receive at least 3.5 roentgens during this project. This will include personnel such as sample crews, decontamination crews, Project 2.66 aircrews and L-20 or H-19 aircrews assigned to TBU.

x. General:

(1) Test Unit Commanders will be responsible for the preparation of complete, detailed and workable emergency plans for radioactive fall-out.

(2) Emergency Evacuation Mission Folders:

(a) Test Unit Commanders will prepare and maintain an Emergency Evacuation Mission Folder for each assigned aircraft except L-21, L-20 and H-19. This folder will be utilized for both natural disaster and radioactive fall-out and will include:

1. A flight plan for each assigned aircraft to include the primary and alternate evacuation destination as designated by aircraft type in Annex D. This flight plan will be in the form shown on the Air Force Navigator's Log.

2. A set of appropriate maps and abort charts with courses and distances to the primary and alternate bases plotted.

3. One Aircraft Clearance Form #175 for each aircraft as complete as possible.

4. Weight and balance form for each aircraft with projected fuel and passenger loads.

5. Passenger manifests as complete as possible.

6. A copy of current instrument let-down procedures for the primary and alternate bases.

7. A detailed diagram showing loading space available.

8. Extracts from Test Unit Evacuation Plans stipulating procedures to be followed at evacuation bases plus departure and re-entry procedures to Eniwetok.

9. A list by type aircraft of possible airfields enroute to the evacuation bases which could be used for emergency refueling.

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(a) Aircraft evacuation crew members will not be assigned to specific aircraft. The procedures set forth in the following example will apply: All crew members (pilots, co-pilots, navigators, etc.) will be listed for the three (3) SAC (IBDA) B-47's. When the order to evacuate is given, the Commander, TAU, will utilize the first individual crew members available to complete the flight crew and will assign them to the first B-47 ready for evacuation. These procedures will be followed until all aircraft to be evacuated have departed. Maintenance crews will remain intact and assigned to their own aircraft in-so-far as practicable.

(4) Preparation for emergency issue of rations and supplies:

(a) No rations other than drinking water and those normally contained in the aircraft emergency equipment are planned for personnel aboard evacuating aircraft. Rations and water aboard surface vessels will be the responsibility of CTG 7.2 and CTG 7.3.

(b) Test Unit Commanders will arrange for the Ration Officers of their elements to procure emergency rations from the Commissary Officer, TG 7.2 to provide for personnel remaining in emergency shelters as required. It is not anticipated that the normal source of drinking water will become contaminated because of radioactive fall-out. However, Unit Commanders are advised that a limited number of large containers are available upon timely request through the D/M, TG 7.4.

(5) Test Unit Commanders will be prepared to inform the Command Post, TG 7.4 of the number of men available for emergency details as required.

(6) Test Unit emergency plans will provide for personnel assigned to vital functions which must continue to be manned. These functions will include the AOC, the Control Tower, Communications, Weather, Fire and Crash crews, and Maintenance Control to include the aircraft refueling capability.

(a) After having been initially accounted for and included in the muster report forwarded to the TG 7.4 Muster Officer at the AOC (TG 7.4 Command Post), personnel will be rotated to procure proper uniform and will be directed to their emergency shelter assignment as rapidly as the "phasing out" of the facility will permit.

6. LOGISTICS:

a. Refueling:

(1) Normally all aircraft will be refueled immediately after landing with the established mission fuel load. For emergency evacuation Test Unit Commanders will insure firm minimum fuel loads for each aircraft sufficient to enable it ot reach the designated emergency evacuation base with the required reserve. Permission will be granted for evacuation aircraft to land at available bases enroute to the primary or alternate evacuation base for the purpose of emergency refueling.

(2) Emergency plans will include an emergency refueling priority for all aircraft if desired, which will be referred to the D/M, TG 7.4 for the establishment of overall priorities. For emergency

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[illegible] Commanders will normally depend upon additional emergency missions required for certain aircraft and recognition of their passenger carrying capabilities. Any changes in the initial established priority will be immediately forwarded to the D/M, TG 7.4 for appropriate action.

b. Maintenance:

(1) All Test Unit emergency plans will include provisions for maximum effort to insure the highest possible aircraft in commission rate immediately after alert notification. Maintenance facilities and personnel will be "phased out" through coordination with TG 7.4 Maintenance Control Officer in case of evacuation.

c. In coordination with TG 7.2, the following facilities will remain operational after evacuation to be available for re-entry of aircraft to Eniwetok:

(1) Runway lights.

(2) Radio Beacon.

(3) Loran Station.

(4) Radar Beacon.

7. COMMAND AND COMMUNICATIONS:

a. Evacuation Organization: The AOC will be established as the TG 7.4 Command Post in all cases of alert. The telephone numbers of the AOC are 3271 and 3268. The Task Group 7.4 Muster Officer and Evacuation Officer will be available at this Command Post to receive muster reports and carry on required communications with Test Unit Command Posts throughout the period of alert.

(1) Each Test Unit Commander will designate a Muster Officer and an Evacuation Officer. The duties of the Evacuation Officer will be to coordinate the planning and implementation of emergency plans for radioactive fall-out. The duties of the Muster Officer will be to receive, monitor and corrdinate muster reports from subordinate elements to be presented to the Task Group 7.4 Muster Officer as required. One officer may be designated as both Muster and Evacuation Officer.

(2) Each Test Unit Commander will provide for an evacuation organization within each element as desired to insure adequate control of all personnel and the procurement of emergency rations. A Muster Officer will be appointed to be in charge of and accompany each group of personnel assigned to a surface vessel for evacuation.

(3) The senior TG 7.4 officer present at each emergency evacuation base will assume command of all TG 7.4 personnel. He will maintain continuous liaison with the Base Operations Officer to receive re-entry instructions from the TG 7.4 evacuation command post at Kwajalein or Guam.

b. Communications:

(1) Normal communications facilities will be utilized to include the AOC, Tower, and those "hot lines" available.

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Annexes:

A - Security

B - Notification and Conditions of Alert

C - Personnel Control

D - Personnel to be Evacuated

E - Emergency Aerial Evacuation Capability and Bases

F - Surface Vessel Evacuation Capability