

THIS DOCUMENT CONTAINS
OF 5 PAGES
Copy 5 of 6 SERIES A

STAFF, COMARMA JTF-
7th Fleet AF-12
c/o Fleet Post Office
San Francisco, California

DA
For the Atomic Energy Commission

ROBERT L. JACKSON *J.M.* for the
San Francisco Branch
~~CONFIDENTIAL~~
RECLASSIFIED

From : Radiological Safety Advisor
To : The Commander Joint Task Force One
Subject: Occupancy of Target Vessels as Influenced by Intensity of Radiation of Various Types on Target Vessels.
BY AUTHORITY OF *Control of Control off.*
DATED *2001/11/14* *IN AFSWP, Under the*
on Oct 6, 1949

1. GAMMA RADIATION: (a) First Stage - Boarding parties, instrument recovery parties, and work parties are permitted aboard target vessels when the intensity of gamma radiation is such that the exposure for the elapsed time is no more than 0.1 r. This must include the exposure while approaching the ship to be boarded and while waiting on the tug or other vessel transporting the boarding teams. There is very little leeway in this since approximately 10% of the daily permitted dose is already taken up by the exposure to which all the Task Force are subjected every day while living in the lagoon. Furthermore the erratic location of high and low intensities on the target ships does not permit an accurate estimate of any one individual's exposure since he may hesitate longer near a high intensity than was expected, thus accumulating more than a tolerance dose. Up to the present time, this extra exposure has been of no serious moment but as the number of personnel on target vessels becomes greater and the tendency to get slight over-exposure increases, day by day, this factor will become more and more serious. (b) Second Stage - As the intensity of gamma radiation diminishes by way of decontamination procedures and decay, more and more pressure develops for putting full crews aboard to work and live and eat aboard. This pressure has already become acute as the intensity of gamma radiation drops below the average of 1.0 r/day, when the elapsed time permitted is two hours or greater. This is a practical working period for successive shifts and large numbers of men can be employed in cleaning up ships decks. This period is also the period of greatest danger of contamination of the hands, feet, and clothing of the working parties. There is a subtle inhalation hazard the exact magnitude of which is not known but which may be serious. This exists in the form of fine dry particles, spray and fine water droplets which contain fission products. No masks will filter out the finest particles. As the use of such masks gives a false sense of security they are not recommended. Creating a apparatus can be used

140692

R

~~TOP SECRET~~

~~CONFIDENTIAL~~

By Authority of the U. S. Atomic Energy Commission

Per: *Stafford Warren* Date *Nov 21 1948*
Document No. LXXII-8-5A

~~TOP SECRET~~

Stafford Warren
DOE/UCLA

203

~~CONFIDENTIAL~~
TOP SECRET

to protect personnel against this inhalation hazard. Unfortunately this hazard persists long after gamma radiation does.

2. BETA RADIATION: Third Stage - When the intensity of gamma radiation has been reduced to 0.1 r/day, there exist high intensities of beta radiation in various ratios, varying between 200-500 times that of the gamma radiation. Contamination of hands and faces with beta emitters of intensities greater than tolerances (0.5r/day) is exceedingly common. It is not infrequent to find personnel with amounts on the bare hands bordering on erythema dose levels (if not removed within 24 hours). It is almost impossible to enforce the wearing of gloves continuously on badly contaminated ships, during the clean up stages under present circumstances where large numbers of men are involved. Nor is it feasible to expect them to take the proper care of their contaminated clothes. Practices which can be applied with safety in plants through long time supervised training and guidance cannot be employed with safety in the attack on the present problem in the time available to conduct the proposed study of the target ships.

3. ALPHA EMITTERS: Fourth Stage - As each ship becomes clean enough for continuous occupancy, the amount of alpha emitting material must be considered. The greater the original contamination the greater is the intensity of alpha contamination to be expected. Its detection is a matter of great difficulty yet it is insidiously toxic in very minute quantities. Where only one or two lethal doses are spread over a whole ship the problem is small and of no consequence. However some of the most important ships have had many lethal doses deposited on them and retained in crevices and other places involved in the final clean up stages where scraping and other dry methods of removal will be used. Here the inhalation hazard will be extensive and unpredictable. It can only be evaluated by a careful survey of each ship during the progressive phases of the clean-up. This decontamination requires meticulous care and an elaborate set up of equipment and trained men, none of which are available within the resources of the JTF-1 and the Manhattan District. Trained personnel and equipment will have to be developed over a matter of four or more months of intensive work and instrument building.

4. The Radiological Safety Section was brought out to Bikini on the basis of a short term safety program. It was understood that the key personnel were to be returned to the United States by 1 September. It was especially difficult to obtain personnel having proper qualifications after Presidential postponement of the tests. Additional qualified men and instru-

~~CONFIDENTIAL~~

Stafford Warren
DOE/UCLA 204

~~CONFIDENTIAL~~

TO: SAC, WASH

monitors are not available even now. Universities, Manhattan District laboratories and plants, and various civilian and military and naval organizations loaned men for this short summer period, only. These men are urgently needed by their employers at home on the dates agreed to before hand. Instrument technicians (enlisted men) were persuaded to sign up until 1 September. They now insist upon returning to continue their schooling. Were it not for these qualified agreements, personnel for the Radiological Safety Section could not have been assembled. Those who have participated have been worked hard for days and nights and they are approaching physical exhaustion. Monitoring demands have been increasing steadily while our numbers are being depleted by return airlifts (these in accordance with previous contracts). Attempts to delay these men has met with unanimous refusal. The training progress undertaken during the two tests has produced about twenty fairly good monitors out of the seventy bodies -- (provided they are properly supervised).

5. INSTRUMENT SITUATION: Relatively few instruments remain in trustworthy condition. Intensive work is going on now on the Haven to provide for all that can possibly be left with the Task Force. Only the following are or will be usable condition: (a) 30 - 247 Ionchambers for high intensity survey work. These will have an attrition rate such as to deplete them entirely in about three months. There are no replacement parts for repairs (except by cannibalism). (b) 30 - X-263 Geiger Counters for determining safe occupancy. These are especially delicate instruments and it can be expected that their attrition rate will be very high, especially because of their past hard usage. They are difficult to repair. Spare parts for them have been consumed. They will last about six weeks and will have to be replaced. (c) One-hundred pencil electrometers to measure daily dosages. Attrition will be about 10% per week and repairs can only be done at the factory. Replacements can be made by mail beginning in about one month. (d) Diving Ion chambers have been designed and built on the Haven since test Able. Many of these fail due to leakage after one or two days use. This instrument should be redesigned and built to withstand the high pressures of deep water. It is estimated that no less than two months will be required for this. (e) The alpha meters are delicate laboratory instruments and need constant care. Those used so far have had hard usage and will last only a few days more at best. They

~~CONFIDENTIAL~~

Stafford Warren
DOE/UCLA
205

~~CONFIDENTIAL~~

TOP SECRET

need new parts which are not available. This type of equipment too, should be redesigned to satisfy the particular requirements here. (f) Five filter queens (110 a.c.) for measuring air hazards when ventilation is turned on in target ships. These require alpha measuring devices for only a rough index can be obtained from the beta gamma measured on the filters. Even with negative findings by this instrument alpha emitters still may be present when beta gamma emitters are low or absent in the collected dust. Thus a guarantee for safe occupancy cannot truly be given on any apparently completely contaminated ship. (g) Photometry - One well trained enlisted man is available and adequate equipment. Enough films are available for about three weeks work at a slower tempo and a sufficient additional supply has been ordered. Only one-hundred personnel badges can be processed and analyzed daily for the next month. The one qualified man can train assistants to increase the output to 300 per day in a month's time. A record of each man's daily exposure can thus be made, to provide medical legal records. It is obvious however that the working parties on target ships must be restricted to the above numbers.

6. SHIP FORCE AND SITUATION: The evaporators and salt water lines and bottoms of all ships in commission in the lagoon have continued to store up active materials. This group of vessels should be removed from the lagoon as soon as possible to reduce this slowly developing hazard. Monitoring of each evaporator cleaning will be necessary at the lagoon or at every base where these ships dock if chemical treatment is not satisfactory. The hulls may clean up on the way home yet any ship put up in dry dock should be monitored before the hull is cleaned. As much as the equivalent of 1 gm. of radium per ton of dry weight of evaporator scale or hull marine growth is now contained in an on these ships. The amount increases daily in spite of the continued decrease in concentration of the lagoon water and far exceeds the loss by the decay rate.

7. CONCLUSION: The target vessels are in the main extensively contaminated with dangerous amounts of radioactivity. Quick decontamination without exposing personnel seriously to radiation is not possible under the present circumstances and with present knowledge. Control of the safety of target ship's crews is rapidly getting out of hand. Adequate monitoring personnel and instruments are no longer available. The present stage of survey and experimentation is about finished and indicates

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

the urgent need for an extensive program suited to the local requirements. This will take months of preparation, instruction of personnel, and fabrication of instruments. The Task Force finds itself at a period where no further gain can be obtained without great risk of harm to personnel engaged in decontamination and survey work unless such work ceases within the very near future.

9. RECOMMENDATIONS: (a) It is recommended that the present operations in the Bikini lagoon be terminated on 15 August 1946 since there is neither equipment nor adequate monitoring personnel available to continue safely operations beyond this date. (b) It is recommended that a small force be organized and left at Bikini as a stop gap to continue (1) small scale studies of decontamination procedures (2) recovery of such instruments as become available (3) to prevent the sinking of whatever vessels that can be saved without risk of exposing personnel to dangerous amounts of radioactivity (see attached proposed monitoring plan). (c) If it is contemplated that the Task Force return to Bikini either for further study of the problem now presented or to prepare for test Charlie it is recommended that the proper arrangements be made and facilities be made available to handle the problem of decontamination on the large scale necessary to do so. These recommendations are made only after mature deliberations and have the unanimous support of my medical legal advisors and the whole membership of the Radiological Safety Section.

Stafford L. Warren
Colonel, MC.

DISTRIBUTION:

Cy 1 & 2 A	CJTF-2
Cy 3A	Depcontechdir
Cy 4A	Maj. Gen. H. H. Groves
Cy 5A	Col. J. H. ...
Cy 6A	File

~~CONFIDENTIAL~~

Follow-up Bikini Monitoring Program - Radiological Safety Section.

1. It is recommended that a special ship, like a transport, be modified immediately into a "change house".

- a. All personnel participating in any work on board target ships must change clothes, wash and shower, and be monitored there at the end of each working day. They must pick up their boots or booties, gloves, coveralls, and other equipment, leaving their own shoes and clothes behind at the start of each day.
- b. Special laundry services, boot washing, glove washing, and hand decontamination services must be set up.
- c. Trade hand monitoring instruments can be made to serve before the Haven leaves. Suitable equipment for this purpose must be made in the USA and sent out. This will take about two months.
- d. This ship should have a tie up for clean boats to transport personnel to the "change house" from the ships on which personnel are berthed and a tie up for contaminated boats to transport them to and from contaminated sites.

2. Quarters should be furnished on a suitable ship for (a) an instrument shop (20' x 30' or equivalent), photometry (dark room, office, and files storage), four offices (data room with files) and three administrative offices with yeoman typists.) and quarters for about 25 officers and enlisted men.

3. There are only instruments available sufficient to equip approximately 20 monitors for two months. The dark room requires a temperature controlled development tank. This is not available on the Sultan but might be transported from the Lt. McKinley or other source to the chosen ship.

4. The following organization is tentatively proposed. Its exact make up will depend upon what personnel can be detached from planned programs in the USA and retained here.

(Enclosure 1)

Stafford Warren
DOE/UCLA

208