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Submitted by:

PRIVACY ACT MATERIAL REMOVED

PARTIAL CONTENT

Observations and Suggestions Resulting from Participation in Test Able and Test Baker

A. Civilian Atomic Bomb Monitoring Corps

I was aware that the monitors were probably chosen because they were physicians or scientists experienced in radiation or radiology, or both, as well as that they were selected from widely scattered communities throughout the country. It seemed to me that the training we received and the first-hand experience we gained with phenomena associated with atomic bomb explosions would be best exploited and most useful to our nation in time of the inevitable atomic bombings of our cities if we were organized into a nation-wide corps of monitors instantaneously available for service during and following such attacks. We could have a civilian status such as that of Air-Raid Wardens and members of the Civilian Defense Corps during World War II. We should be provided with suitable identifying insignia and credentials to enable us to perform our duties as expeditiously as possible. A travel and communication priority for such emergency use should be assigned us so that we could contact a central headquarters immediately at any time and be directed to travel to those cities or areas in our own communities which had greatest need for monitoring. We should have in our possession at all times several recently tested instruments (see below) both for replacement and for deputies trained on-the-spot for their use under our direction. We should also have several hundred signs marked

Dangerous Radioactivity
Do Not Stay Here Over
_____

with the blank to be filled in by the monitor in minutes or hours with black wax crayon.

The experience we gained at Bikini should be considered as our initial training period. We should be assembled at a source of large amounts of radioactivity, such as a pile, periodically every two or three years for refresher purposes and to acquaint us with the proper use of the latest instruments supplied us as they evolve. Since several scores of German scientists were captured by a potential enemy and are undoubtedly now being exploited by that nation for the development of methods

of production of atomic bombs, we may anticipate that an atomic bomb attack on our cities may be launched at any time, swiftly and without warning, probably by rockets or by placements by saboteurs. Therefore the proposed Civilian Atomic Bomb Monitoring Corps should be organized (and probably expanded) as soon as possible. Those monitors who served in Operation Crossroads might serve as the nucleus of such a corps. A large number of new monitors should be trained at Test Charley to be added to the first group. A large supplementary list might be recruited from those qualified by extensive monitoring experience on the Manhattan District.

B. P-T Boat Rescue and Monitoring Units

I was stationed aboard PGM 24 for Test Able and aboard PGM 32 for Test Baker. As you know, all of the gun-boats became badly contaminated with radioactivity after Test Baker which limited their usefulness somewhat in that the crews had to be evacuated at night because the excessive radioactivity could not be dissipated by running the ships at sea. Moreover, these vessels have a minimum speed of about eight knots which is too great for probing into sharply delineated areas of highly radioactive water such as we encountered. Thirdly, fairly large crews are required to man them. On the other hand, the LCP(L)'s became liabilities when their ~~small~~ motor failed and they were likely to drift into high radioactivity.

Therefore I should like to suggest that in time of war for purposes of rescue of salvagable crews of ships on the fringes of atom-bombings (for morale if nothing more) as well as monitoring functions, that a boat intermediate in size be provided. Probably a P-T boat or a modification of it would serve the purpose. Such a craft should have the approximate specifications:

a) Two completely independent engines, screws, etc.
b) Be as large as possible (sea-worthy) but still small enough that it could be hoisted out of the water and the paint contaminated during the day could be removed readily and a new coat of specially designed paint be applied during the night in readiness for next day's activities.
c) Be speedy and very maneuverable so that rescues could be affected in a short time in waters that would be too "hot" to operate in with slower boats.

C. Instruments

As you are well aware, the multiplicity of instruments served only to confuse us. However, their number and variety was a good thing since it enabled a critical evaluation of performance in the field to be made.

It is of course essential that three separate instruments be available for the performance of a satisfactory monitoring job:

1. A rate meter in "r" per day
2. A cumulative dose meter
3. Film badges (optional)

Apparently the film badges we used were satisfactory insofar as gamma radiation was concerned, although I have no basis for judging their efficacy. See D. below for comments concerning beta radiation.

I thought the pocket electroscope type dosimeters supplied us were quite satisfactory. The Proteximeter was worthless.

The confusion nearly all lay with the various types of rate meters. The X-263 was very unsatisfactory for the following reasons:

a) It too often failed to function entirely. Nearly everyone finally tried to get hold of three or four of them to assure himself that at least one would be working by the time he had reached his assigned post.
b) It did not read directly in "r" per day.
c) It became very erratic and was often misleading on the 20X scale when it was essential that it function well.
d) It did not measure high enough radiation intensities.

On the credit side the X-263 was:

a) Light and easy to carry.
b) Very sensitive (more so than necessary).
c) The head-phone feature was a good one.

For monitoring after atomic bombings of our cities it will be necessary that a fool-proof rate meter be available that will embody all, at least, of the following:

1. It must measure up to 200 "r" per day.
2. It must have a thin enough window that fairly low energy beta rays will be measured along with the gamma rays. This is an absolute "must". See D. below.
3. At rates above 1 "r" per hour a safety warning bell or buzzer should sound continuously.
4. The lower limit of sensitivity would not need to be less than about 0.01 "r" per day.
5. The dial should have a lighting device behind it for reading in the dark.
6. New batteries easily installable.
7. It must be sturdy and may weigh up to four or five times that of the X-263 if carried in the hand or more if designed to be strapped on the back.

In order to have the range indicated above, the meter must have several scales which must operate from the same zero setting with easy switching between scales.

There is good agreement among physicists experienced in measuring radiation intensities that an ionization chamber is much more reliable than a counter device, especially when portability is desired.

The contamination of my clothes and the screen (the mesh of which only occupied about one-third of the total area) led me to believe that much air-borne (probably as aerosols) beta-emitting material was spread around by the Baker bomb. Aside from injuries to the skin and underlying structures from contamination of the clothes and hair, I would be concerned with that which entered the lungs since a man at rest on the ships would have breathed in about 400-500 liters of the contaminated air per hour. I do not believe that the film badge values for beta plus gamma compared with gamma alone had much significance because the sensitive film was encased in thick paper plus a metal foil that would have stopped completely much soft beta radiation which, however, could still have been sufficiently energetic to injure the thin and delicate lung structures.

I am not an alarmist, Colonel Warren, and I am fully cognizant that hind-sight is much better than fore-sight. It is my opinion that probably no permanent radiation injury was sustained by any of the participants. I do believe though that many of us probably received much more penetrating, ionizing radiation than the instruments of very low beta-sensitivity were able to record. I have included this section principally because many of us were very apprehensive and because I believe that air-borne beta radiation stabilized by the dusts of our atom bombed cities may be several times more dangerous than the attendant gamma radiation. Practical application of this opinion in preparation for such eventualities would be to design the instruments provided the Civilian Atomic Bomb Monitoring Corps proposed above, or other monitoring agency, so that both the rate meter and cumulative dose meter recorded beta radiation (insofar as possible) along with the gamma radiation.

E. Peculiar Baker Day Phenomenon

There was observed a peculiar well delineated haze over the target area by several of us aboard PGM 32 as we approached the lagoon entrance about two hours after the Baker bomb burst. The fact that the halo-like effect remained very symmetrical throughout the four or five hours during which it gradually decreased in size and faded in intensity would indicate that it may have been associated with some sort of radiation. Even when most intense, it would have been difficult to record photographically and success would probably have resulted only if the camera would have been directed paralled to and not more than a hundred feet or so above the surface of the lagoon. Its approximate shape and relationship to the target area at about 1100 and 1430 is sketched below.