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CIVIL DEFENCE COMMITTEE

THE PROBLEM OF FALL-OUT

Additional Notes by the Senior Civil Defence Advisor

INTRODUCTION

In a memorandum (AC/23(CD)D/106 of 28th May, 1955) some of the problems of fall-out and their effects on Civil Defence were set out, and were discussed by the Civil Defence Committee at their last meeting (27th-29th June, 1955).

2. Some points of particular importance were raised, which were not included in the first memorandum referred to in paragraph 1 above. The following supplementary notes have been prepared in the hope that they will be of assistance and will serve to bring together the additional information which became available.

PART I

THE UP-WIND AREA OF CONTAMINATION

(a) The probable situation

3. In the release by the Atomic Energy Commission on "Fall-out" (15th February, 1955), in paragraph 18, it was stated that "there was a contaminated area up-wind and cross-wind extending possibly 20 miles from the point of detonation". From the point of view of Civil Defence operations, this possibility is one that caused the gravest concern.

4. It had been generally assumed that Civil Defence operations would have to be concentrated mainly on the up-wind side of the damaged areas, since the incidence of fall-out and other factors might make approach from the down-wind side impossible or extremely hazardous; and that approach from either flank, though possible, might be limited, at least to some extent.

5. The suggestion that the up-wind approach was also likely to be rendered equally hazardous over the whole of the area in which the counter attack was planned threw doubts at once on the possibility of successfully conducting any Civil Defence operations against areas which had experienced a ground burst.

6. As a result of the discussions at the Committee and especially of the scientific advice given by a member of the United States Delegation, however, the picture became less sombre.

7. It was pointed out that the figures given in the AEC's release must not be taken as definitive or final, since they were in fact, idealised figures and were based on information which was far from complete. The figure of twenty miles up-wind from Ground Zero should be considered as an order of magnitude and that it did, in practice, apply to one particular set of conditions.

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8. The actual situation in the up-wind (and of course in the down-wind) area, after a ground burst, could only be assessed in the light of conditions at the time; and that the pattern would be influenced by the strength and behaviour of the wind, the nature of the soil, the size of the weapon and other factors. The most favourable conditions from the standpoint of Civil Defence operations, would be a strong wind. Absence of wind, or a fickle wind, would clearly cause difficulties.

9. A further point of importance lies in the fact that the up-wind area of contamination is unlikely to form a tidy pattern or a neat radius from Ground Zero. It will most probably be irregular - as would the whole fall-out pattern - and it seems, on balance, to be unlikely that Civil Defence services would be denied entry into the whole area. They will have to assess the position for themselves, however, at the earliest possible moment.

(b) The Effect on Civil Defence Operations

10. The Civil Defence Services have got to go into action as quickly as they can. And it is clear that the up-wind area probably offers the best starting point: though it is equally true that they will have to seize their opportunity in the light of conditions at the time.

11. Remembering that from the point of view of life-saving - the primary task of Civil Defence - the effective period is probably about 48 hours, it will be seen that the task of getting the information about the fall-out position and keeping a careful watch on it, is of first importance and needs to be done with the utmost despatch.

12. Just how the collection of this information is arranged will be a matter to be worked out nationally, though an exchange of views would obviously be helpful. It is suggested that it will probably have to be based on both static and mobile observations and that a strong emphasis will need to be placed on pushing forward a Civil Defence reconnaissance screen into an area where it is hoped to start operations; and following up this screen with the Civil Defence forces so that they can get to work without any loss of time. The two should move forward in echelon, in fact, so far as this is practicable.

13. One of the most important points to remember is that the area of up-wind contamination will be an irregular pattern and it is essential to find quickly and the points where the greatest penetration can be made, so far as debris and other factors will allow. The fire situation will need careful assessment and watching and it may well be that the reconnaissance screen would have to be accompanied or very closely followed by a fire service screen. The proper tactics, however, want thought and study.

14. The question was raised, as to whether any form of protective clothing would be helpful to enable a quicker penetration of the area to be effected. It was not, however, felt that there would be value in such equipment since the biggest hazard would be gamma rays. There might, however, be some personal protection measures which could be suggested, though the whole question needs further consideration.

15. Governor Val Peterson has stated recently^(x) that "although the Atomic Energy Commission release (on fall-out) did not mention

(x) Answer to question put by Sub-Committee on Civil Defence of the Senate Armed Services Committee.

the degree of contamination up- and cross-wind it is quite probable that a contamination level of 50 roentgen/hour would be contained within a six mile circle." This information was received after the Committee meeting and is included as it is relevant to these notes.

16. The following conclusions and recommendations are put forward provisionally on Part I.

CONCLUSIONS

- (a) that, from the point of view of Civil Defence operations, the up-wind area from Ground Zero is of the highest importance, as offering the best prospects for starting such operations at the earliest moment;
- (b) that, although the up-wind area will almost certainly be subjected to fall-out contamination, the pattern may be irregular; and it is unlikely that it would be so extensive as to prevent Civil Defence operations save in the most unfavourable circumstances;
- (c) that it will be important for the Civil Defence Services to monitor this up-wind area as soon as it is practicable so as to discover not only those parts of the area in which it is reasonably safe to work; but also the extent of the penetrations that can be made, subject to limitations of fire and debris;
- (d) that the monitoring will probably have to be accomplished by the aid of such static arrangements as may be in force supplemented by a mobile screen;
- (e) that in view of the fact that such life saving operations as may be possible must be accomplished in approximately 48 hours, speed is of the utmost importance; and the Civil Defence Services should be ready to follow up the mobile screen and if practicable to keep fairly close behind it while allowing themselves room to manoeuvre on either flank according to the state of the roads;
- (f) that information in regard to the fall-out pattern up-wind is still deficient, though its dependence on the size of the weapon, the strength and direction of the wind, the nature of the soil and other factors will always make it imperative for the Civil Defence Services to check the position before committing their forces;
- (g) that although particular emphasis has been placed on the up-wind area, for obvious reasons, the possibility of effecting entries into the areas of damage from other directions must not be overlooked. The wider the area the Civil Defence forces can attack the better.

RECOMMENDATIONS

- (1) that the best and quickest method of obtaining information of the fall-out pattern in the up-wind area from Ground Zero, and getting the Civil Defence Services into action as quickly as possible, is a tactical problem which needs careful study - possibly at suitable Government Civil Defence Colleges. And that an exchange of

ideas, after they have been carefully considered, would be of value.

- (ii) that thought should be given to and ideas exchanged on the question as to whether there are any personal protective measures that would assist Civil Defence personnel to effect a quicker entry to the up-wind or indeed any other area.
- (iii) that further information in regard, especially, to the fall-out patterns in the up-wind area will be of particular importance in helping to devise the best tactics for Civil Defence operations, and in particular to help to speed up these operations as much as possible.
- (iv) that the development of any instrument which will help to cut down reconnaissance times is of particular interest in connection with Civil Defence operations and any further information and progress will be of special interest.

PART II

OTHER FALL-OUT PROBLEMS

(a) Warning of fall-out

17. As a result of the discussions at the Civil Defence Committee meeting there was general agreement that the collection, interpolation and issue of information on which fall-out warnings would be based was a matter of great importance on which an exchange of ideas would be helpful.

18. So far as thinking has progressed it was provisionally thought.

- (a) that there must be very close integration between Civil Defence and the meteorological services for initial forecasting purposes;
- (b) that it would probably be important to base the monitoring of the fall-out on a static system since in small countries especially the whole area of the country would have to be covered;
- (c) that the static system would need to be supplemented by mobile reconnaissance teams and air reconnaissance; and, in certain circumstances, arrangements for monitoring to be carried out at sea would be important. It will probably be found that an international monitoring system on a regional basis will need to be developed to assist in the evaluation of attack damage and other matters.
- (d) that the need to monitor the up-wind area was of special importance to Civil Defence operations and that speed in providing a picture of the situation in this area was of particular significance;
- (e) that there might obviously be a considerable manpower problem in providing personnel to man the monitoring organization; and that any arrangements or devices which would save manpower would be important; further that the simpler any monitoring instruments could be

made the better so that unskilled personnel could be quickly and easily trained to use them.

RECOMMENDATION

19. It was recommended that there should be a further exchange of views on the organization and equipment being developed for monitoring radio-active fall-out, with particular reference to the problem in the up wind area.

PART III

MISCELLANEOUS PROBLEMS OF FALL-OUT

(a) Agriculture

20. During the discussion the Committee were told that the two elements of greatest concern to health were iodine 131 which had a half-life of eight days and tended to concentrate in the thyroid glands of animals and human beings, strontium 90 and possibly 89. The half-life of strontium is 20 years. Strontium tends to become fixed in bone tissue.

21. In regard to the question of contamination of milk due to iodine 131, information is far from complete, but as an interim suggestion, the milk should be monitored and if it was found to be above the maximum recommended contamination then the cream should be separated from the milk. The two parts should be monitored separately. The scientific member of the American Delegation stated that in his opinion cream possibly would be more salvageable than milk.

22. Crops which have already matured before contamination could be immediately harvested and washed. Crops in other stages, including those yet unplanted, might bring up long half-life radio active material from the soil and make it part of the usually edible portion. Each plant has special characteristics and there is considerable variation in the uptake. The whole question needs much further study.

(b) Water Supplies, Fish, Inhalation of radio-active dust - Decontamination

23. Attention is drawn to the United States Federal Civil Defence Administration pamphlet dated 27th May 1955 headed "Questions and Answers on Fall-out" which has recently been circulated to all members of the Alliance.

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