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MEMORANDUM FOR: The Director of Central Intelligence

FROM : William W. Wells
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): Protection of Troops Against Toxic and Radioactive Substances and Bacterial Means

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article criticizes the training of troops for protection against nuclear, chemical and biological weapons, the equipment available to them and the organization of reconnaissance, making the general assertion that all personnel, not just specialists, must be able to perform protection functions. The author's recommendations include having dosimeters issued and serviced as radio equipment, using the protective suit designed for civilians in place of the existing individual protection outfit, developing an all-purpose decontaminating solution, and carrying out only partial decontamination treatment of personnel under combat conditions. This article appeared in Issue No. 1 (71) for 1964.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies. For ease of reference, reports from this publication have been assigned

William W. Wells

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Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 1 (71) for 1964 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The author of this article is Major I. Grabovoy. This article criticizes the training of troops for protection against nuclear, chemical and biological weapons, the equipment available to them and the organization of reconnaissance, making the general assertion that all personnel, not just specialists, must be able to perform protection functions. The author's recommendations include having dosimeters issued and serviced as radio equipment, using the protective suit designed for civilians in place of the existing individual protection outfit, developing an all-purpose decontaminating solution, and carrying out only partial decontamination treatment of personnel under combat conditions.

End of Summary

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Protection of Troops Against Toxic and Radioactive Substances and Bacterial Means

by

Major I. Grabovoy

Research of the training of troops in protection against toxic agents, radioactive substances, and bacterial means has shown that along with certain successes in the solution of this extremely complex problem there are still rather great shortcomings. The main reason for the most significant failures lies, in our opinion, in the fact that in most instances protection of troops against weapons of mass destruction is the responsibility primarily of certain special supporting units or subunits. Meanwhile, the task of protecting troops against weapons of mass destruction cannot be carried out without the participation of all personnel who are trained in the specific techniques of protection and equipped with the necessary means. Unfortunately, it is very difficult to carry out scheduled training of all personnel in the techniques of protection against toxic agents, radioactive substances, and bacterial means for the very reason that the appropriate officer specialists for the most part are in the special subunits and units.

For example, we have many well-trained chemical officers but, as a result of established organizational principles, they are concentrated primarily in the chemical defense units and subunits and almost never participate in the training of all the personnel.

To illustrate this situation, let us take a motorized rifle or tank regiment. Each of them has two chemical officers: one is the chief of the chemical service and the other is the commander of the radiation and chemical reconnaissance platoon. This number is quite sufficient for competent resolution of all the matters of training the personnel in protection against toxic, radioactive and bacterial means (we notice that no single army in the world has such a number of chemical warfare specialists). But a close look at the everyday employment of the chemical officers of a unit shows that they spend almost all of their working time in the radiation and chemical reconnaissance platoon (the platoon commander -- 100 percent of his time, the chief of the chemical

service 40 to 50 percent of his time). The chief of the chemical service is quite often called upon to perform duties that are not connected with his immediate assignment. In fact, he is able to devote no more than 10 to 15 percent of his working time to the training of the officers of the regiment headquarters and subunits, noncommissioned officers and enlisted men. The result is that there are specialists, but they almost never train the regiment's personnel.

A similar picture is observed, unfortunately, in other units and large units also. The one-sided use of the cadre of the chemical troops means that a large part of the special equipment and vehicles is concentrated in the chemical defense units and subunits, whereas the troops are insufficiently supplied with the required means. Equally apparent is the excess of certain equipment and vehicles supplied to the chemical defense troops. Take, for example, the AGV-3M mobile hot-air decontamination station that is used to decontaminate, with a steam-air-ammonia mixture, the clothing, personal equipment, footwear and individual means of protection that have been contaminated with droplets and vapors of toxic substances. This station consists of four special vehicles and is manned by a crew of 13. The station costs 25,000 rubles. If, however, we consider all the expenditures connected with the upkeep and training of personnel in peacetime, the cost of fuel and of the expended vehicle mileage reserves, as well as the difficulties of collecting the contaminated clothing and delivering it to decontamination centers under combat conditions, and the impairment of the strength and quality of treated objects, then it becomes quite clear that the AGV-3M decontamination vehicles have not proved themselves, and that it is considerably more advantageous to provide an additional supply of clothing that will completely replace the contaminated clothing than to spend enormous funds for these vehicles and to allocate personnel to service them. If necessary, clothing can be decontaminated by even simpler methods, for example, by boiling, treating with solutions, or by natural self-decontamination.

Evidence of excesses in instruments and sets in some directions and the lack of sufficient instruments and sets in other directions also is encountered in the organization of radiation and chemical reconnaissance, the supplying of troops with individual means of protection, and the organization of the

decontamination treatment of troops.

As is well known, radiation, chemical, and bacteriological reconnaissance is organized in the units and subunits of all the branch arms for the purpose of providing timely detection of radioactive contamination and chemical attack, as well as of determining the nature of the contamination in the area of operations of the subunit. This is executed by the specially trained personnel in all the subunits and by the chemical reconnaissance personnel of the special chemical defense subunits. The desire to have T/O chemical reconnaissance personnel in the units and large units at the time when nuclear weapons had just appeared, and troops were beginning to master the matters of protection against them, is quite understandable. Now, when considerable experience has been accumulated in organizing radiation and chemical reconnaissance and in mastering methods of conducting it using the personnel of the subunits of all the branch arms, it has become clear that it can and must be conducted by non-T/O chemical reconnaissance personnel and by combined-arms, engineer, and air reconnaissance subunits. Indeed, why should engineer reconnaissance and radiation-chemical reconnaissance be organized separately for the reconnaissance of one and the same route of march?

In the future this task will be made easier to carry out by equipping troops with as many automatic instruments as possible, by simplifying the operation of these instruments, and by introducing into combat training the most effective methods of training in radiation and chemical reconnaissance. The same may be said also of the organization of radiation and chemical observation. Why is it necessary to establish chemical observation posts manned by the chemical reconnaissance personnel at command posts, when their tasks are being performed successfully by the personnel who are responsible for the security of these posts and of the troop disposition areas? On the march, radiation and chemical observation is conducted by specially designated observers in the subunits as well as by the personnel of the road traffic control service.

From what has been said we may draw the conclusion that radiation and chemical reconnaissance has to be conducted by personnel in the subunits of all the branch arms; this will provide for more rational utilization of troop personnel and, in

addition, increase the responsibility of the commanders of the subunits for the organization of this reconnaissance. We think that under present conditions the conduct of radiation and chemical reconnaissance must become the same sort of element of combat support of all troops that security is. All personnel must be trained to conduct it.

In this connection, the matters of supplying the troops with dosimetric instruments, repairing and calibrating them, are acquiring great importance.

First of all, a few words on the use of equipment. We have a sufficient number of special, expensive reconnaissance vehicles, the BRDM-RKh and GAZ-69RKh, which are equipped with various dosimetric instruments, radios, and chemical reconnaissance instruments. Is this necessary? If we concur in the fact that radiation and chemical reconnaissance should be carried out by non-T/O chemical reconnaissance personnel within all of the subunits, then the main technical means must, of course, be used to provide the most complete equipping of all the subunits of the troops with the simplest instruments for radiation and chemical reconnaissance by reducing the number of such instruments in the special subunits, as well as by reducing the number of special radiation and chemical reconnaissance subunits themselves.

In this connection it is necessary to dwell briefly on such an important matter as the maintenance of instruments with the troops. The accumulated experience in this matter provides a basis for concluding that the present procedure for repairing and calibrating dosimetric instruments has not been satisfactory and requires revision.

Indeed, at a time when the number of dosimetric instruments being supplied to the troops is continuously increasing, the units have neither the means nor the specialists to look after them. Even the division PRKhM chemical repair shops cannot provide timely calibration and repair of all the dosimeters in the division and attached units even in peacetime.

In our opinion it would be quite rational to have the communications service, rather than the chemical service, supply the troops with dosimeters as radio equipment, and to have the

dosimeters repaired in the radio repair shops that exist in every unit. Moreover, it does not take much time to train radio repair personnel in the repair of dosimeters, since these instruments are much simpler in design than any radio.

The proposed organization of the supply of troops with dosimeters, their repair and calibration, will be more reliable, simpler, and will provide a better possibility of maintaining them in a state of constant operability.

However, before going on to the next question we must mention the poor condition of the existing troop means of individual antichemical protection.

The combined-arms set of individual means of protection, as we know, consists of gas mask, protective cape, protective overboots, gloves, and personal antichemical kit. With correct and timely use of these means one can protect the respiratory organs, the eyes, and skin from radioactive and toxic substances and bacterial means. If we assume the possibility of extensive employment of nuclear, chemical and bacteriological weapons (which is most probable under present-day conditions), then the personnel will have to remain in their protective means a great deal of the time and conduct combat actions in them. This means that when any model of individual means of protection is considered, not only must their reliability be taken into account, but there also must be an assessment of how these means will allow personnel to engage in combat actions for an extended time period and how convenient they are to use.

It must be said that the individual means of protection now available to the troops are very reliable, but have been designed for short-time use only and are very inconvenient to handle. First of all, the gas mask. It appears that no one who has had anything to do with one has ever said that it is easy to operate for a long period of time while wearing one.

As we all know, the combined-arms gas mask was devised for protection against toxic agents of not particularly long-term effect, and it was only later on, apparently as a means of doubling up of functions, that the gas mask began to be used for protection against radioactive substances as well. Even if this doubling up of functions was justified initially, it is now time

to give it up. It obviously is necessary to have means for protecting the respiratory organs from radioactive substances (respirators) and separate means for protection against toxic agents and bacterial means (gas masks).

The same situation is encountered in the case of the combined-arms cape, protective overboots and gloves. The total weight of these items in the individual protection outfit is over three kilograms, five kilograms including the gas mask, which makes up approximately half the total weight of the soldier's pack. This seems to be quite a bit. But let us consider whether this is so necessary for protecting a soldier, and whether such a load is justified.

In considering this question we must start with the purpose of each item, whether its specifications correspond to present requirements, and its advantages over existing types of issue clothing. The combined-arms cape does not under any circumstances fully protect against radioactive substances, it provides negligible protection against the vapors of toxic agents, but protects well against toxic agents in the liquid-drop state. It is heavy and inconvenient to use. It takes a lot of time to put it on as a coverall, especially at night. When it is worn fastened up, or as a coverall, and the temperature is 20 to 29 degrees, the time it can be worn is reduced down to 50 to 20 minutes because of overheating of the body. Meanwhile, if we imagine the most typical modern combat situation, it is not difficult to understand that the most frequently required protection will be against radioactive substances and toxic vapors, considering the great depth of dissemination of toxic agents, and rarely will protection be needed against toxic agents in the liquid-drop state.

Accordingly we may conclude that the most suitable means of protection will be not the combined-arms protective cape, but the ZFO-58 type of permeable protective suit, which consists of an impregnated combination coverall made of cotton fabric in a special cut, a cap liner and impregnated underwear. If necessary, this suit can be issued in place of the regular uniform. It will not burden the wearer, is comfortable to work in, provides good airtightness and protection against radioactive substances and toxic vapors, and reduces the degree of effectiveness of liquid-drop toxic agents. The impregnation of

the protective clothing can be organized under field conditions. If we consider the fact that toxic agents such as sarin and V-gas are fast-acting and will be employed suddenly, then we must say frankly that the protective clothing must almost always be in "combat status", i.e., personnel should wear it continuously. This requirement is satisfied completely by the ZFO-58 permeable protective suit, supplemented by a light protective cape (not cotton). In comparing the ZFO-58 suit, designed for protecting the population, and the army impregnated uniform designed for protecting troops against toxic vapors, one has to admit that the former is the more improved.

As we all know, at present each serviceman of the various services needs a large number of items: underwear, uniform, overcoat, special clothing (for tank personnel, missilemen, drivers, etc.), rain cape, combined-arms protective outfit, and camouflage clothing. At the same time there is a real possibility that the ordinary uniform and rain cape will be adapted for protection against radioactive, toxic and bacteriological agents, rain, and thermal radiation. The accomplishments of the chemists in obtaining materials with given properties are well known. What is not understood is why they have not yet found a practical application to the development of individual means of protection.

A few words regarding the protective overboots. They appeared in our army a rather long time ago, when there were few vehicles for transporting personnel, and the rated norms for the expenditure of toxic agents in contaminating an area were comparatively high in view of their low toxicity. The necessity of having protective overboots under these circumstances is fully obvious. Under present conditions, however, the advisability of special protective overboots is open to doubt. Indeed, it has been found that the ordinary footwear protects reliably against radioactive substances, and with appropriate treatment performs quite satisfactorily in protecting against toxic agents in the vaporous, and even liquid-drop, state. Thus the protective overboots should be excluded from the combined-arms protective outfit and used only under special conditions.

We should also note that, whereas in summer the existing combined-arms protective outfit can still be used to some extent, in winter it only burdens the soldier (the overboots do not pull

on over the felt boots, the protective cape more often than not cannot be put on over the overcoat, and this is even more the case with the thermal jacket), and the rubber of the helmet facepiece of the gas mask gets hard and has to be heated. For these reasons, in wintertime the matter of individual protection of personnel is very difficult to resolve.

* * *

Weapons and equipment exposed to contamination by radioactive and toxic substances and bacterial means can, within a certain amount of time, become sources of injury to personnel. Decontamination treatment is devised for decontaminating them; according to current guides this treatment is divided into partial and complete. The partial treatment is done by the forces and means of the subunits exposed to the contamination, without interrupting the execution of the combat tasks, and in an extremely short time frame. The complete treatment is aimed at guaranteed safety of the treated objects for use by personnel.

Experience has shown that in many cases this division is purely formal, and the designation does not reflect the nature of the procedure.

The correct procedure would be to divide the decontamination treatment not according to completeness (it often is difficult to say whether a treatment is partial or complete since the necessary completeness is in some cases achieved with partial treatment), but according to the conditions of its execution, and should be called, for example, first-priority decontamination treatment, second-priority decontamination treatment, etc. In addition to the, to a certain degree, formal shortcoming that we mentioned, there are still many unsolved problems in the matter of organizing the decontamination treatment of troops.

One of the main problems is the absence of a single solution for the chemical decontamination of equipment that has been contaminated with toxic agents such as yperite and sarin, and for the radioactive decontamination of equipment contaminated with radioactive substances. Therefore, three different solutions are required to ensure constant readiness to treat contaminated equipment among the troops.

Until atomic weapons appeared, two chemical decontamination solutions were sufficient. On this basis, decontamination vehicles and instruments were devised, which are still in service with the troops.

In recent years the troops have been receiving equipment and vehicles which have only one tank (ARS-12D truck-mounted sprayer station, IDK individual decontamination set, GDK group decontamination set, etc.) and may be filled with any one solution. This may be proper, especially if we consider the fact that a single all-purpose solution must be developed for such vehicles and equipment. No such solution is yet available, but in our view it is possible to use one solution instead of three.

In examining the properties of chemical decontamination solutions No. 1 and No. 2, it is not difficult to come to the conclusion that, in case of necessity, when objects contaminated with yperite must be decontaminated, solution No. 1 can be replaced by solution No. 2, which is effective against sarin, lewisite, and, to a lesser degree, against yperite. If we keep in mind the fact that the sarin-type agents are the most dangerous and fast-acting and occupy first place among all the toxic agents in the plans of the aggressive circles of the US, then it is clearly advisable to use solution No. 2 rather than a collection of decontaminants. This likewise considerably increases the capability of the troops to carry out decontamination operations, since with one tank the supply of a main, and to a certain degree all-purpose, decontamination solution is doubled. This being the case, if each truck, tank and any other object were supplied with a 20-liter canister of solution No. 2, there would be a real possibility of carrying out a complete decontamination of equipment using the forces and means of the subunit itself. The importance of this approach is completely understood if we keep in mind the high toxicity of neuroparalytic agents. It is known that even after moving out of a contaminated area the personnel may not remove their gas masks until a complete decontamination of the weapons and combat equipment has been carried out.

Practice has shown that those commanders who wait for assistance from a superior in organizing complete decontamination treatment are acting incorrectly. We must remember that in the case of massed employment of nuclear and chemical weapons there

is no possibility of sending special decontamination vehicles to all the subunits exposed to nuclear and chemical attack. All of the forces and means which may be employed to eliminate the aftereffects of toxic and radioactive agents must be put to use without delay. In so doing, it is necessary to distinguish clearly the danger arising from contamination of equipment by toxic agents and that from radioactive substances. In the case of toxic agents, the complete treatment must be carried out as quickly as possible; with radioactive substances such haste is not necessary.

In conclusion I should like to mention the decontamination treatment of personnel. It is planned that partial decontamination treatment will be carried out right in the troop battle formations, and complete treatment -- after the troops have completed their assigned task, or as soon as the situation permits. Treatment may be set up within the subunits or at decontamination treatment stations established by subunits of the chemical troops.

Of the necessity of partial personnel decontamination treatment there is no doubt, but as far as the complete treatment, the basis of which is the washing of the personnel, is concerned, it would be more proper to combine it with the scheduled hygienic bathing of personnel, and to have it done not by subunits of the chemical troops, but by the clothing supply service together with the medical service. Organized in this way, the complete decontamination treatment of the troops would not detract from the execution of the combat tasks and would allow the troops to maintain constant combat readiness. We may assume that, in the case of contamination with toxic agents, complete treatment is effective only if it is conducted immediately after the contamination, and this is scarcely possible in a combat situation. Treatment can be delayed a little more in the case of radioactive contamination, however, since even when the entire integument is contaminated with a density 30 times the permissible, the dose of radiation from it would be no more than 30 roentgens after 30 days. Therefore, in the case of both contamination by toxic agents and contamination by radioactive substances, treatment may be limited to partial, with the washing of the personnel immediately after the completion of the combat task.

These are our proposals directed toward further improving the training of troops for combat actions under conditions in which means of mass destruction are employed. The organization of the protection of troops against toxic agents, radioactive substances and bacterial means must be raised to a higher level and new accomplishments of science and practical experience must be more courageously introduced.