

COMMITTEE ON DISARMAMENT

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Working paper concerning the verification of the presence of nerve agents, their decomposition products or starting materials downstream of chemical production plants

1.1. A NON-INTRUSIVE METHOD TO VERIFY A BAN ON THE PRODUCTION OF NERVE AGENTS

One of the functions of an effective verification system with respect to a ban on the development, production and stockpiling of chemical weapons is to deter the production of chemical weapons, in particular the very dangerous nerve agents. To achieve adequate deterrence, procedures are necessary to ensure that a sufficient chance exists that clandestine production of nerve agents will be detected. On the other hand, one always strives for verification methods which are as non-intrusive as possible.

As a contribution to solve part of the problems involved, a highly sensitive method will be described to analyse waste water downstream of chemical production plants and to compare this with an upstream sample with the purpose of detecting the presence therein of nerve agents, their decomposition products or starting materials. The analytical procedure may be carried out in every laboratory equipped with a gas chromatograph and the method is sufficiently sensitive to give a positive indication even after extensive water purification.

From the results it may be concluded that the reported procedure gives a practically unambiguous and simple yes or no answer to the question whether nerve agents, their decomposition products or starting materials are present or not. After a positive detection -- which would only make the plant suspected -- a visit to the plant could be made to reveal the identity of the product manufactured.

1.2. BASIS OF THE METHOD

The nerve agents are organophosphorus compounds and structurally related to pesticides. Generally both types of compounds may be prepared in similar production plants. However, an important structural difference between both types of compounds exists. The majority of the nerve agents is related to methylphosphonic acid (I),