CD/167
26 March 1981
Original: ENGLISH

CANADA

VERIFICATION AND CONTROL REQUIREMENTS FOR A CHEMICAL ARMS CONTROL TREATY BASED ON AN ANALYSIS OF ACTIVITIES

INTRODUCTION

There seems little doubt that most nations would prefer to see the end of chemical weapons and of the threat of chemical warfare. Chemical weapons are not generally integrated components of conventional arsenals and are not required for normal defensive purposes by any nation. There is no excuse for a nation possessing them to avoid the timely negotiation of a protocol. Yet the Committee on Disarmament and its predecessor, the CCD, have actively negotiated for nearly 15 years without success.

The two Superpowers, the United States and the USSR, are the only nations thought to possess significant quantities of chemical weapons. Since neither needs them for defensive purposes, except for retaliation in kind against the other, a disposal formula which would preserve the relative security of each should be achievable. This would remove the bulk of world chemical arsenals and the remaining nations would most likely follow suit. However, even in direct bilateral negotiations, agreement has not been possible.

The major stumbling block appears to be verification mechanisms which would assure each Superpower that the promised weapon destructions in fact take place and that no new weapons are produced. There is a distinct difference of opinion on the extent of international involvement in verification activities and on the degree of intrusiveness which must be allowed. This situation may be further strained if the reported disparity in stocks continues or the United States decides to renew its capability with binary weapons. The problem of verification involves political judgements, but it is also a technical matter, and every effort should be made to ensure that technical difficulties do not stand in the way of an agreement.

In spite of the great variety of verification proposals that have been made over the years, no clear agreement has been reached as to which should be implemented. To assist in overcoming this block to agreement it should be feasible to systematically review the technical requirements for verification for each basic activity to be undertaken or banned. This should determine the minimum levels of verification

necessary and in particular the minimum levels of intrusiveness which would be unavoidable. It should then be possible to predict the type and levels of national and international control which must be provided under a treaty.

The following is an attempt to provide an initial analysis of these factors. It leads to suggested guidelines for national and international verification agencies. A general statement on control mechanisms to which this analysis is related was provided in a presentation to the Ad Hoc Working Group on 27 June 1980 (CD113).

ACTIVITIES

From a survey of past proposals including previous protocol drafts, there appears to be general agreement that a treaty should require elimination of existing chemical warfare agents, weapons (including all means of delivery) and their means of production, and it should ban the further development, production, acquisition, retention or stockpiling of chemical agents and weapons. The Geneva Protocol bans "use", however it is subject to conditions with respect to retaliation and its scope is not clear. To settle these matters and to deal with the problems of dual purpose agents and binary components, a further ban on "use" should also be included in a new treaty, and verification mechanisms for use are assessed in this analysis. This leads to a list of basic activities which will require some form of monitoring and verification. They fall into two groups, activities which must be undertaken, and those which must be banned.

A. Activities to be Undertaken and Monitored

1. Declaration of existing agent and chemical weapon production facilities including specific sites.

2. Declaration of existing agent and weapon stocks including storage sites and numbers.

3. Dismantling of existing production facilities.

4. Destruction of existing agent and weapon stocks.

B. Activities to be Banned and Verified

5. Development of new agent/weapon systems.

6. Construction or conversion of new agent or weapon (means of delivery) production facilities.

7. Production of chemical agents.

8. Retention, stockpiling or other acquisition of chemical agents and weapons.

9. Offensive military training or other activities in preparation for undertaking chemical warfare.

10. Use of chemical weapons for war purposes including dual purpose agents and binary components.

For the purpose of the following analysis, a comprehensive definition of chemical agents such as that given in CD117, which includes the use of any toxic effect on plants, animals or man in warfare, has been assumed.

ANALYSIS OF ACTIVITY REQUIREMENTS FOR VERIFICATION AND CONTROL

A. Activities to be Undertaken and Monitored

1. Declaration of existing agent and chemical weapon production facilities including specific sites. Should any nation declare production facilities for agents or weapons, their existence would not likely be doubted. Remote confirmation of the declaration may be possible by "National Technical Means" (satellite) which is available to the Superpowers but not to others. No other technical means of verification would be in place at that time. To provide a minimum confirmation to all nations, some on-site visits would be necessary. An inspection team including national and international personnel (non-technical) would be required to meet within the declaring nation, select one declared site at random, and visit it to confirm the accuracy of the declaration. Visits to all declared sites would be highly desirable, but not essential. Such on-site inspection should not put the host nation at risk, since it is unlikely that site or process information beyond that released in the original declaration would be observed. In fact, the visit should serve to demonstrate the good faith of that nation to the world.

2. Declaration of existing agent and weapon stocks including storage sites and numbers. Verification requirements would be identical to those for production facilities. A random visit by non-technical staff to confirm weapon quantities at one site would be an essential minimum requirement. This should include both national and international personnel. The deliberate non-declaration of some existing stocks (or production facilities) would be a violation of the agreement, but this could not be detected by any technical means including on-site visits, and means to do so should not be required of a treaty. Cover-ups might be exposed by "National Technical Means" which would then require a challenge mechanism. Hidden stocks would also be covered by bans on retention and stockpiling and eventually on use of chemical weapons in warfare and would be subject to verification mechanisms required to monitor those activities.

3. Dismantling of existing production facilities. All production facilities for agents and weapons should be dismantled. General agreement seems to have been reached that conversion to other uses would generally not be cost effective and in many instances would not be practical. Dismantling is also the only way to ensure that the facilities could not be rapidly reconverted to agent production and it eliminates the requirement for continued verification of the site. While dismantling toxic agent plants may be hazardous, it should not be technologically complex. It is suggested that any nation declaring such facilities should be able to dismantle them within five years. It may be possible to observe dismantling by satellite (national technical means) but by no other remote means. Satisfactory international verification

can only be achieved by visits. As a minimum, one site could again be randomly selected for inspection by a combined national and international team (non-technical) at the end of the five years. Alternatively all declared sites might be visited at the end of the five years. Inspection once a year would be more desirable but not essential. No sampling would be required. A declaration announcing completion of the task, confirmed by the inspectors, might be expected from each nation at a five year review conference. Failure to complete the task in five years should not constitute a violation of the treaty, if the nation could show that the process was well underway and proceeding on a definite schedule. However, a nation requiring such an extension of time might be required to admit international inspectors to its sites on a semi-annual basis thereafter.

4. Destruction of existing agent and weapon stocks. One approach to this problem might be to accept non-verification assuming that any nation admitting to the possession of CW agents and weapons in a declaration would be compelled to destroy them. Monitoring would be carried out by national agencies, however a few international visits to the site might perhaps be arranged by the nation in question for publicity purposes.

If such non-verification of stock destruction is considered inadequate for treaty purposes, then a much more intrusive and technical means would be required. Technically, the United States may represent the most difficult verification case due to the extreme containment required by its environmental protection laws. Fortunately suitable technology has been developed for the CAMDS */ system and has been released internationally. This or similar contained systems may also be used by other nations. Because of the containment, remote systems including national technical means or black box monitors will not verify the actual destruction of agents. Even periodic visits to storage and destruction sites, with sampling, will not ensure that stockpiles are being completely destroyed (rather than being moved to another hidden site). Monitoring of the process must be virtually continuous with periodic spot sampling and analysis. Inspection teams must be adequately trained, have access to laboratory space, and at least some members must be from the international community.

There has been general agreement that stock destruction would require ten years and this has been confirmed in reports of United States/USSR bilateral discussions (CD48). As a suggested schedule, the first five years might be allowed for building of destruction plants after which stocks could be destroyed at the rate of 20 per cent per year. This would allow retention of weapon ratios till destruction was completed.

B. Activities to be Banned and Verified

5. Development of new agent/weapon systems. Nations with current stocks will already have developed weapons and would require little further work. However development activities could be readily hidden and it would be very difficult to separate work of offensive intent from that for legitimate defensive purposes.

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*/ CAMDS - chemical agent and munition disposal.

Atmospheric testing might be detected by remote means but the use of remote detection systems by international agencies against a specific nation would be tantamount to an accusation. It would also be very expensive. These activities may be routinely monitored and reported by national agencies, but the only international activities which seem feasible would be in response to challenge mechanisms.

6. Construction or conversion of new agent or weapon (means of delivery) production facilities. The construction of new chemical plants or the conversion of existing plants to new functions will occur continuously in most nations. Similar activities will occur with munitions plants. The intent to use new or converted plants for chemical warfare purposes cannot possibly be verified even with on-site inspections. These activities may be monitored nationally, but routine international verification for this activity does not appear to be feasible under a treaty. However, it would be necessary in response to challenge mechanisms.

7. Production of chemical agents. The banning of this activity is a key problem for chemical arms control verification and a technical solution is very complex due to the wide variety of chemicals which may be involved. Proposals over the past 15 years include analysis of economic and production data and a variety of remote, near-site and on-site observations involving sampling and analysis. A number of visits to industrial sites, carried out to determine if clandestine agent manufacture could be carried out in existing plants, have lead to the conclusion that the highly toxic single purpose agents would require special containment not normally available. Inspection, if it includes some sampling, would readily demonstrate the production or non-production of banned chemicals and would not result in compromise of commercial information. Water sampling downstream from a chemical facility should reveal nerve agent production, even from a high containment plant, but may not be suitable for all other agents. It is unlikely that remote air sampling downwind from a high containment plant would be successful. Routine monitoring of chemical plants in all nations including inspections might be feasible for national control agencies, but would be beyond the capabilities of an international agency without a large number of inspectors. In addition, it would be nearly impossible to verify intent for production of dual purpose materials even when it appears there were greater amounts being produced than needed for peaceful purposes.

It is concluded that it would be very difficult to provide verification of the non-production of banned materials on a routine basis by an international agency and that a satisfactory minimum international assurance might be provided by a structured information exchange and response to challenge mechanisms. On-site challenge inspections will require experts and the sampling and analysis of waste water and air effluents as well as process products. Routine inspections and reporting of accurate data on chemical manufacturing within a nation should be carried out by national agencies.

8. Retention, stockpiling or other acquisition of chemical agents and weapons. This activity is closely associated with agent production, although the treaty would also ban the transfer of chemical agents and weapons from one nation to another. Stockpiles once acquired could be readily hidden, especially if they involve binary munitions. Even with routine on-site inspections, verification would be very difficult. International measures, other than information exchange might therefore be limited to challenge mechanisms. Experts and sampling would be required for on-site inspections.

9. Offensive military training or other activities in preparation for undertaking chemical warfare. It has been generally agreed that defensive activities should not be banned and as a result an aggressive intent will be very difficult to verify. While offensive military activities should be included in the ban, international monitoring could be limited to informal exchanges and responses to challenge situations.

10. Use of chemical weapons for war purposes including dual purpose agents and binary components. In many instances the effects of chemical agents used in war will be apparent and verification will be provided by the antagonists. However in some instances involving isolated battles or limited wars and insurrections in remote areas few outside observers will be present and reports of clandestine use of chemicals must be carefully weighed by the international community. If reports are substantial, then the nations involved should be requested to allow samples to be taken at the site by international inspectors within 48 hours of an event if possible so that the use or non-use of chemical weapons could be verified.

SUMMARY OF VERIFICATION REQUIREMENTS.

Through this analysis of specific activities it is apparent that remote detection, as might be available through "national technical means" or at considerable expense to an international verification agency, may be sufficient to arouse suspicions which could lead to challenge situations, but is not likely to be sufficient to demonstrate non-compliance with a treaty. To provide assurance and security for all nations, some on-site inspections would be necessary although it would seem that these occasions should not be an unbearable intrusion. In most instances such on-site visits could be to the distinct advantage of the nation being inspected.

To verify initial declarations and the dismantling of production plants, on-site inspections would require the presence of some international personnel though not necessarily technical experts. For the activities to be banned including development, production, stockpiling and use, the provision of technical means of verification on a routine basis by an international agency would pose overwhelming logistic difficulties. Information and data on these activities should be routinely exchanged through an international verification agency but on-site inspection could be limited to unilateral invitations or challenge situations. For challenge inspections, appropriate experts must be involved and some sampling must be permitted. For the destruction of declared stockpiles intrusion will be greatest as guaranteed verification will require continuous on-site monitoring with periodic sampling and analysis by expert international inspectors.

IMPLICATIONS FOR NATIONAL AND INTERNATIONAL VERIFICATION AGENCIES

A. NATIONAL AGENCIES

On the basis of this analysis each signatory would be required to maintain a national verification group. This need not be a separate permanent group established especially for this purpose, but could be an existing government agency with an environmental or health control function. It would need access to a selection of inspection personnel both technical and non-technical, but they need not be on permanent staff unless a variety of sites require routine periodic visits. The national agency would be responsible for all routine monitoring required by the treaty and for the provision of data and other pertinent information to the international control agency for exchange. If on-site visits and sampling were required either automatically for some activities or by challenge for others, all arrangements within the nation should be provided by the national agency. Whenever samples were to be taken this should be done in triplicate using standardized techniques so that they could be analysed nationally as well as independently in two designated laboratories elsewhere.

B. INTERNATIONAL AGENCIES

For the international verification measures indicated in the preceding sections, technical or non-technical inspectors would be required for most activities; however the level of employment would not warrant placing these individuals on the permanent staff of an international agency. The most logical approach would be for each signatory to nominate one technical and one non-technical inspector who would then be available when needed. Similarly signatories could be encouraged though not required to designate a national laboratory where the analysis of samples could be carried out by standardized techniques on request.

On this basis an international verification agency need consist only of a supervisory (consultative) committee at the political level which would meet periodically or in response to a challenge, supported by a small secretariat. The committee would determine the verification measures to be carried out and arrangements would be made through the secretariat which would also provide for routine measures. From the foregoing analysis it is clear that much of the verification emphasis will be placed on challenge mechanisms and the treaty must specify them in some detail.

CONCLUSIONS

An analysis of verification requirements based on specific activities to be undertaken or banned under a treaty has suggested that the minimum levels needed for adequate assurance to the international community are not extensive and should be achievable by available means. However, it is clear that remote technical means will not provide the necessary measures and for most activities some form of on-site inspection will provide the only realistic evidence of compliance. For only one activity, stockpile destruction, inspections have to involve a significant level of intrusiveness. In all cases, for publicity purposes, inspections should be to the advantage of the nation being inspected unless that nation has been guilty of non-compliance, or for some other unexplained reason denies an inspection.

An international verification agency will require only a controlling (consultative) committee at the political level supported by a small secretariat, with inspectors drawn from nominees provided by each signatory. National agencies will be required to provide most routine monitoring and would collect data within the nation for exchange.

It is hoped that this analysis of verification factors on the basis of activities has provided some insight into the minimum levels essential for international assurance of compliance with a chemical arms treaty and appears to have provided useful guidelines for the establishment of national and international verification agencies.