



UNITED NATIONS
GENERAL
ASSEMBLY



Distr.
GENERAL

A/37/259
1 December 1982

ORIGINAL: ENGLISH

Thirty-seventh session
Agenda item 54

CHEMICAL AND BACTERIOLOGICAL (BIOLOGICAL) WEAPONS

Report of the Secretary-General

1. In its resolution 36/96 C of 9 December 1981, the General Assembly requested the Secretary-General to continue his investigation pursuant to Assembly resolution 35/144 C and to report to the Assembly at its thirty-seventh session. In that resolution, the Assembly decided, inter alia, to carry out an impartial investigation to ascertain the facts pertaining to reports regarding the alleged use of chemical weapons and to assess the extent of the damage caused by the use of such weapons. The Assembly requested the Secretary-General to carry out such investigation with the assistance of qualified medical and technical experts.
2. In pursuance of resolution 36/96 C, the Secretary-General requested the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons to continue its work. In a letter dated 26 November 1982, the Chairman of the Group of Experts transmitted to the Secretary-General the report, which is hereby submitted to the General Assembly.

ANNEX

Report of the Group of Experts to Investigate Reports on
the Alleged Use of Chemical Weapons

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FOREWARD BY THE SECRETARY-GENERAL

1. By its resolution 35/144 C of 12 December 1980, the General Assembly decided to carry out an impartial investigation to ascertain the facts pertaining to the reports regarding the alleged use of chemical weapons and to assess the extent of the damage caused by the use of such weapons. The Assembly, further, requested the Secretary-General to carry out such investigation, with the assistance of qualified medical and technical experts, in order to (a) seek relevant information from all concerned Governments, international organizations and other sources necessary, and (b) collect and examine evidence, including on-site with the consent of the countries concerned, to the extent relevant to the purposes of the investigation.
2. The report of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons appointed pursuant to resolution 35/144 C was submitted to the General Assembly in the annex to document A/36/613, and considered by the Assembly at its thirty-sixth session. In its resolution 36/96 C, the Assembly, taking note of that report and noting that, as indicated by the conclusions of the report, the Group of Experts had not yet completed the investigations called for under paragraph 5 of resolution 35/144 C, requested the Secretary-General, with the assistance of the Group of Experts, to continue his investigation pursuant to General Assembly resolution 35/144 C and to report to the Assembly at its thirty-seventh session.
3. The Group of Experts has accordingly continued its work in the course of the present year. Between February and November it held three sessions and undertook visits to Pakistan and Thailand with the purpose of on-site collection and examination of evidence.
4. The experts, acting in their personal capacities, have submitted their second report to the Secretary-General. The report is hereby submitted to the General Assembly for its consideration, in pursuance of paragraph 2 of resolution 36/96 C.
5. The Secretary-General wishes to express to the experts his sincere appreciation for the efforts they have made in producing their unanimous report. It should be noted that the observations and conclusions contained in the report are those of the Group. The Secretary-General wishes to point out that, with respect to the very complex and technical issues covered by the report, he is not in a position to pass judgement on all aspects of the work accomplished by the experts.

LETTER OF TRANSMITTAL

26 November 1982

Sir,

I have the honour to submit herewith the report of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons, which was appointed by you in pursuance of paragraph 5 of General Assembly resolution 35/144 C of 12 December 1980 and Assembly resolution 36/96 C of 9 December 1981.

The experts appointed by you were the following:

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The report was prepared between February and November 1982, during which period the Group held three sessions: the fourth session from 4 to 22 February at Geneva, the fifth session from 21 to 30 July at Geneva and the sixth session from 13 October to 22 November 1982 at Geneva and New York. 1/ During its fourth and sixth sessions respectively, between 9 and 22 February and 25 October and 10 November 1982, the Group also undertook visits to Pakistan and Thailand for the purpose of on-site collection and examination of evidence.

Mr. Javier Pérez de Cuéllar
Secretary-General of the United Nations
New York

/...

The members of the Group of Experts wish to express their appreciation for the assistance that they received from members of the Secretariat of the United Nations. They wish, in particular, to convey their thanks to Mr. Sohrab Kheradi, Senior Political Affairs Officer, Centre for Disarmament, who served as Secretary of the Group, to Mr. Boiko Tarabanov, Political Affairs Officer (Deputy Secretary of the Group), Centre for Disarmament, and to Dr. Johan Santesson, Research Director, National Defence Research Institute, Umeå, Sweden, who served as Consultant to the Secretariat.

The members of the Group are grateful to all the Governments concerned and others who have been instrumental in contributing to their work, in particular to the Governments of Pakistan and Thailand, for their full assistance and co-operation to the Group during its visits to those countries, as well as to the laboratories that undertook to conduct the necessary chemical analyses on the samples obtained by the Group.

I have been requested by the Group of Experts, as its Chairman, to submit to you on its behalf its report, which was unanimously approved.

(Signed) Esmat A. EZZ

Chairman of the Group of Experts to Investigate
Reports on the Alleged Use of Chemical Weapons

I. INTRODUCTION

1. By its resolution 35/144 C of 12 December 1980, the General Assembly called upon all States parties to the 1925 Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare ^{2/} to reaffirm their determination strictly to observe all their obligations under the Protocol, and appealed to all States to comply with the principles and objectives of the Protocol. Further, the Assembly decided to carry out an impartial investigation to ascertain the facts pertaining to the reports regarding the alleged use of chemical weapons and to assess the extent of the damage caused by the use of such weapons and requested the Secretary-General to carry out such investigation, inter alia, taking into account proposals advanced by the States on whose territories the use of chemical weapons had been reported, with the assistance of qualified medical and technical experts who should (a) seek relevant information from all concerned Governments, international organizations and other sources necessary and (b) collect and examine evidence, including on-site with the consent of the countries concerned, to the extent relevant to the purposes of the investigation. The Assembly also invited the Governments of States where chemical weapons were used to provide the Secretary-General with all relevant information they might have in their possession, called upon all States to co-operate in this investigation and to provide any relevant information they might have in their possession regarding such reports and requested the Secretary-General to submit a report on the matter to the Assembly at its thirty-sixth session.
2. Pursuant to that resolution, the Secretary-General sent to all the Member States a note verbale dated 26 January 1981 requesting any information that the respective Governments might deem appropriate to provide in that connection, to which communications were received from 24 Governments. Since the adoption of resolution 36/96 C of 9 December 1981, in addition to these communications, others were received, including communications from the Government of the United States of America on 24 February, 22 March, 20 May and 7 October 1982, as well as from the Government of Canada on 23 June, 25 August and 7 September 1982.
3. In its resolution 36/96 C of 9 December 1981, the General Assembly recalled its resolution 35/144 C, took note of the report submitted by the Secretary-General (A/36/613), noted that the Group of Experts had not yet completed the investigation called for under paragraph 5 of General Assembly resolution 35/144 C and noted also the views of the Group of Experts concerning the importance of prompt on-site investigations and the need to devise appropriate procedures for impartial collection and analysis of samples that might be obtained in the course of any such investigation. The Assembly requested the Secretary-General, with the assistance of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons, to continue his investigations pursuant to General Assembly resolution 35/144 C and to report to the Assembly at its thirty-seventh session.
4. Pursuant to resolution 36/96 C, the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons continued its investigation during three sessions held between February and November 1982. The organization of work and the proceedings of the Group are summarized in section II of this report.

5. Section III describes the sources of information upon which the investigation was based.
6. Section IV sets forth an evaluation of the written submissions.
7. The Group undertook visits to Pakistan and Thailand with a view to collecting and examining evidence from victims and/or eyewitnesses of the alleged use of chemical weapons. Details concerning these visits and an evaluation of the interviews conducted on site are given in section V.
8. Section VI is concerned with the question of physical samples obtained during the investigation, the adopted procedure for analysis of those samples and its implementation and, finally, the results of the analyses.
9. The conclusions arrived at by the Group appear in section VII of the report.
10. The report also contains a number of annexes, which are as follows:
 - I. Communications sent on behalf of the Group of Experts; II. Samples obtained by the Group of Experts during its visit to Thailand in 1981; III. Samples obtained by the Group of Experts during its visit to Pakistan; IV. Samples obtained by the Group of Experts during its visit to Thailand in 1982; V. Summary of statements made during interviews conducted by the Group of Experts during its visit to Pakistan; and VI. Summary of statements made during interviews conducted by the Group of Experts during its visit to Thailand in 1982.

II. ORGANIZATION OF WORK AND RECORDS OF PROCEEDINGS

11. Pursuant to General Assembly resolution 35/144 C, by which the Secretary-General established the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons, and resolution 36/96 C, which requested the Secretary-General, with the assistance of the Group of Experts, to continue his investigations pursuant to the former resolution, the fourth session of the Group was held at Geneva between 4 and 22 February 1982. Between 9 February and 22 February, the Group also undertook a visit to Pakistan for the purpose of on-site collection and examination of evidence pursuant to operative paragraph 5 (b) of resolution 35/144 C.
12. At the start of the session, the Group reviewed the situation since the submission of its last report (A/36/613) to the Secretary-General.
13. The Group was also informed by the Chairman of the consultations that had been undertaken with various specialized agencies and United Nations bodies, including the Food and Agriculture Organization of the United Nations (FAO), the International Atomic Energy Agency (IAEA) and the United Nations Division of Narcotics Control, regarding the question of conducting analyses of samples obtained in Thailand as well as those undertaken with other experts in the field of mycotoxins.
14. Further, the Group considered the question of the analysis of the samples obtained during its visit to Thailand in 1981 and possible samples that might be obtained during the impending visit to Pakistan. After long and careful consideration, the Group devised what it considered to be an appropriate procedure for conducting analyses of samples that might contain chemical warfare agents. The procedure is discussed in section VI.
15. Originally, it had been decided that the samples from Thailand should be subjected to extensive analyses including, for example, a search for all known chemical warfare agents, as well as trichothecenes, by a laboratory under supervision of an international organization. However, after elaborate consultations, it was found that the organizations concerned did not possess the necessary facilities for the purpose and that the size of the samples precluded an extensive analysis. Analysis for trichothecenes was given the highest priority in the case of samples obtained from Thailand and, following protracted discussions, a number of laboratories specializing in mycotoxin analysis were selected for conducting the analyses.
16. During the final phase of its fourth session, the Group selected a number of laboratories to be approached for the analyses of the samples obtained during the on-site visit to Pakistan.
17. The fifth session of the Group was held at Geneva from 21 to 30 July 1982. In the course of the session, the Group considered the results of the chemical analyses of the samples obtained during its visit to Pakistan. A report on those results is presented in section VI. Since not all results of the analyses of the samples from Thailand were available during the fifth session, the Group decided to postpone consideration of those results until its next session.

18. The new submissions by Member States, received during 1982 (see para. 32), were examined in depth and evaluated by the Group during the session. The evaluation is set forth in section IV of this report. The Group considered it necessary to seek clarification and further information on some of the reports on alleged chemical attacks contained in documents A/37/72, A/37/152-S/14915 and A/37/202-S/14986 submitted by Democratic Kampuchea, as well as document A/37/157 submitted by the United States of America. Accordingly, letters and annexed questionnaires drafted by the Group were transmitted at its request to Democratic Kampuchea and the United States of America respectively (for the contents of the letters and questionnaires, see annex I).

19. In accordance with paragraph 5 (b), of resolution 35/144 C, regarding collection and examination of evidence, including on-site with the consent of the countries concerned, the Group during 1981 considered the question of visits to those countries where alleged use of chemical weapons had taken place, as well as those where alleged victims of alleged attacks were living in refugee camps. In that context, the possibility of a visit to Democratic Kampuchea was also considered. However, as a result of extensive discussions concerning the security and logistical aspects that might be involved in such an on-site visit, the Group decided to postpone a decision on the matter, pending further consultations. Prior to the fifth session of the Group of Experts, a letter dated 16 June 1982 was received from Democratic Kampuchea, inviting the Group to visit Democratic Kampuchea "during the next dry season beginning in October 1982, to carry out its inquiries on the spot".

20. In this regard, the Group held an extensive exchange of views during which questions were raised, in particular, on the matter of adequate guarantees from Democratic Kampuchea concerning the security of the Group during a possible on-site visit and on the need for obtaining the necessary logistical support in that context. Furthermore, the Group underlined the importance of arriving on the scene in the shortest possible time following an alleged chemical attack. Taking into account the above considerations, as well as a number of other matters, the Group drafted the text of a letter to be transmitted, on its behalf, to the Permanent Mission of Democratic Kampuchea to the United Nations in New York. In this connection, the Group authorized its Chairman to ascertain that adequate responses to the queries contained in the letter to Democratic Kampuchea had been received and thereafter to finalize the decision regarding the Group's possible on-site visit to Democratic Kampuchea.

21. The Group decided to make an emergency approach to the Government of Thailand requesting its co-operation for a new visit by the Group to that country in connection with information contained in the new submissions and the possibility of collecting and examining new evidence from victims of alleged chemical attacks that had been reported to have occurred since the Group's last visit there. In this respect, a letter drafted by the Group was transmitted, at its request, to the Permanent Mission of Thailand in New York.

22. The sixth session of the Group was held between 13 October and 22 November 1982. The session was convened at Geneva and, during the session, between 25 October and 10 November, the Group undertook a visit to Thailand for the

purpose of on-site collection and examination of evidence pursuant to paragraph 5 (b) of General Assembly resolution 35/144 C. The visit to Thailand was made by the Group in connection with information contained in the new submissions and with the possibility of collecting and examining new evidence from victims of alleged chemical attacks that had been reported to have occurred since the Group's visit in 1981, and pursuant to the acceptance from the Government of Thailand to visit the holding centres for refugees from Indo-China in pursuance of paragraph 5 (b) of Assembly resolution 35/144 C.

23. During its stay in Thailand, the Group also pursued the question of an on-site visit to Democratic Kampuchea. However, despite every effort, it was not possible to obtain adequate replies to the specific queries raised in the letter of 27 August 1982, transmitted on behalf of the Group, and the annexed questionnaire (see annex I). The Group was therefore forced to conclude that the matter could not be constructively pursued any further at that stage.

24. During its sixth session, the Group considered the results of the analyses of the samples obtained during the on-site visit to Thailand in 1981, which were not available during its fifth session. A report on those results is presented in section II. The Group also examined thoroughly and evaluated the new submissions by Member States, received since its previous session.

25. Furthermore, with respect to the originally suggested procedures for analysis of the samples, the Group, taking into account the time constraints involved, decided to adopt alternative procedures for analysis of the samples obtained during its on-site visit to Thailand in 1982 and submitted the samples for analysis in accordance with the new procedures adopted.

26. After its return to New York, the Group considered the results of the analyses of the samples. A report on these results is presented in section VI.

27. In accordance with a suggestion made in the United States submission of 7 October 1982, the Group also met with United States analysts and other technical experts and undertook a more detailed discussion of some of the points covered in that submission.

28. Further, the Group met with the Permanent Representative of Democratic Kampuchea in order to discuss his letter dated 9 November 1982 to the Secretary-General.

29. Finally, the Group considered and finalized its report, which it adopted for submission to the Secretary-General on 26 November 1982.

III. SOURCES OF INFORMATION ON THE SUBJECT OF THE ALLEGED USE OF CHEMICAL WEAPONS

30. In the course of discussing its mandate, the Group, as it had done in the previous year, considered the parameters of its investigation in terms of the documentation on the basis of which it would conduct its investigation.

31. With respect to the documentation to be addressed, the Group reiterated its position as outlined in paragraph 27 of the Secretary-General's report to the General Assembly (A/36/613) which, inter alia, stated that the Group decided that, for practical reasons, it would be necessary to concentrate, in the first place, on the communications received from Governments by the Secretary-General, in pursuance of paragraphs 6 and 7 of resolution 35/144 C, in which the Assembly invited the Governments of States where chemical weapons were used to provide the Secretary-General with all relevant information they might have in their possession, and called upon all States to co-operate in this investigation and to provide any relevant information they might have in their possession regarding such reports.

32. In addition to the documents listed in the previous report, the Group deemed it necessary to take account of the relevant documentation and official records of the thirty-sixth session of the General Assembly and of the second special session devoted to disarmament, as well as of the relevant documentation on this matter submitted in connection with the thirty-seventh session of the Assembly. The following additional documents were considered by the Group:

- (a) Documents of the thirty-sixth session of the General Assembly:
 - (i) Report of the Secretary-General (A/36/613);
 - (ii) Letter dated 24 November 1981 from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/36/721-S/14770);
 - (iii) Letter dated 3 December 1981 from the Chargé d'Affaires a.i. of the Permanent Mission of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/36/769);
 - (iv) Letter dated 3 December 1981 from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General (A/C.1/36/16);
- (b) Official records of discussion at the thirty-sixth session of the General Assembly;
- (c) The relevant documentation and official records of discussion at the twelfth special session of the General Assembly;
- (d) Documents of the thirty-seventh session of the General Assembly:
 - (i) Letter dated 19 January 1982 from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/37/72);
 - (ii) Note verbale dated 24 February 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/102);

- (iii) Letter dated 19 March 1982 from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/37/152-S/14915);
- (iv) Note verbale dated 22 March 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/157);
- (v) Letter dated 7 April 1982 from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General (A/37/173);
- (vi) Letter dated 14 April 1982 from the Chargé d'Affaires a.i. of the Permanent Mission of Viet Nam to the United Nations addressed to the Secretary-General (A/37/180);
- (vii) Letter dated 19 April 1982 from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/37/202-S/14986);
- (viii) Letter dated 27 April 1982 from the Permanent Representative of the Lao People's Democratic Republic to the United Nations addressed to the Secretary-General (A/37/210);
- (ix) Letter dated 28 April 1982 from the Permanent Representative of the Lao People's Democratic Republic to the United Nations addressed to the Secretary-General (A/37/212);
- (x) Letter dated 30 April 1982 from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General (A/37/219);
- (xi) Letter dated 20 May 1982 from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General (A/37/233);
- (xii) Note verbale dated 20 May 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/234 and Corr.1)
- (xiii) Letter dated 22 June 1982 from the Chargé d'Affaires a.i. of the Permanent Mission of Cuba to the United Nations addressed to the Secretary-General (A/37/333-S/15278);
- (xiv) Letter dated 23 June 1982 from the Permanent Representative of Canada to the United Nations addressed to the Secretary-General (A/37/308);
- (xv) Letter dated 5 August 1982 from the Chargé d'Affaires a.i. of the Permanent Mission of Viet Nam to the United Nations addressed to the Secretary-General (A/37/376);

- (xvi) Letter dated 6 August 1982 from the Chargé d'Affaires a.i. of the Permanent Mission of Viet Nam to the United Nation addressed to the Secretary-General (A/37/377);
- (xvii) Letter dated 25 June 1982 from the Chargé d'Affaires a.i. of the Permanent Mission of Viet Nam to the United Nations addressed to the Secretary-General (A/S-12/AC.1/57);
- (e) Official records of discussion at the thirty-seventh session of the General Assembly;
- (f) Conference room papers:
 - (i) Conference room paper 1/Add.11 - Letters dated 25 August and 7 September 1982 from the Permanent Mission of Canada to the United Nations addressed to the Secretariat transmitting reports entitled respectively "An epidemiological investigation of alleged CW/BW agents in SE Asia" and "Report on possible use of CW agents in southeast Asia";
 - (ii) Conference room paper 1/Add.12 - Note verbale dated 7 October 1982 from the Permanent Representative of the United States of America to the Secretary-General, including attachments A to D.
 - (iii) Conference room paper 1/Add.13 - attachment E to the note verbale dated 7 October 1982 from the Permanent Representative of the United States of America to the Secretary-General, submitted on 15 November 1982.
- (g) Unofficial communications on the subject with respect to the Eritrean region and South-East Asia;
- (h) Letter dated 3 June 1982 from the Atmospheric Sciences Center, Desert Research Institute, Nevada;
- (i) Letter dated 2 September 1982 from the Permanent Representative of the Democratic Republic of Afghanistan.

33. The Group recognized that, in carrying out its task, it could explore other necessary sources of information as stipulated in paragraph 5 (a) of resolution 35/144 C, including General Assembly documents from the previous years.

34. After a thorough examination of the relevant documentation, the Group found that various statements containing allegations of the use of chemical weapons in recent wars and in military operations were related to a number of areas of the world but that, in a majority of instances, those claims were not pursued in the communications submitted in reply to the note verbale of the Secretary-General.

IV. EVALUATION OF WRITTEN SUBMISSIONS

35. In the evaluation of the written submissions received after the report of the Secretary-General (A/36/613) was submitted to the General Assembly, the Group of Experts considered all relevant documentation and official records as listed in paragraph 32. Although the evaluation of the written submissions encompassed all aspects raised, the following presentation focuses mainly upon certain areas in the submissions where the Group to some extent disagreed with the conclusions presented. Only in a few cases of special significance is it pointed out that the Group shares the opinion as set forth in the written submissions.

36. The Group took note of the letters dated 24 November 1981 (A/36/721-S/14770), 19 January 1982 (A/37/72), 19 March 1982 (A/37/152-S/14915) and 19 April 1982 (A/37/202-S/14986) from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General, and of the letter dated 3 December 1981 from the Chargé d'Affaires a.i. of the Permanent Mission of Democratic Kampuchea to the United Nations addressed to the Secretary-General (A/36/769) containing a number of allegations of use of chemical weapons and toxic substances.

37. These submissions contained a number of allegations concerning the use of chemical weapons during combat, for example, firing of poison gas shells and aerial spraying of toxic chemicals. The Group of Experts was of the opinion that further information and clarifications were needed in respect of these allegations and, accordingly, prepared a letter together with a questionnaire which, at the request of the Group, was transmitted to the Government of Democratic Kampuchea (see annex I).

38. The Group of Experts studied the note verbale dated 24 February 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/102), which reported on the results of analyses of blood samples taken from victims of an alleged chemical attack. The note verbale contained, inter alia, the following statement:

"The tentative identification of HT2 in the blood of two victims cannot be taken as conclusive scientific proof of toxin exposure since the trace amount of the compound present precluded unequivocal identification and quantitation, and also because many other medical problems in addition to toxin exposure can cause a decrease in white cell counts. It is interesting to note that the individual who showed the lowest white cell count also showed the greatest amount of the compound tentatively identified as HT2 in his blood and was reported to have received the greatest exposure to the agent. He was exposed to contaminated water for over 30 minutes and was the only victim who fell down in the water and actually swallowed some of it. However, the results of these two independent analyses, coupled with the description by victims of symptoms correlating exactly with those associated with trichothecene poisoning, provide strong circumstantial evidence that trichothecenes were used as chemical agents in yet another chemical attack in South-East Asia."

In the opinion of the Group, this statement appears to be a correct evaluation of the results of the analyses reported in the note verbale.

39. The Group also considered a note verbale dated 22 March 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/157). This contained a compilation of data relating to the alleged use of chemical weapons in South-East Asia and Afghanistan, some of which had already been included in earlier submissions from the United States of America. In the submission it was stated, inter alia, that

"the evidence upon which this report is based is of several kinds, including: testimony of those who saw, experienced, and suffered from chemical weapons attacks; testimony of doctors, refugee workers, journalists and others who had the opportunity to question large numbers of those with firsthand experience of chemical warfare; testimony of those who engaged in chemical warfare or were in a position to observe those who did; scientific evidence, based upon the analysis of physical samples taken from sites where attacks had been conducted; documentary evidence from open sources; and intelligence derived from "national technical means". (A/37/157, annex)

40. With respect to testimony of the first type, referred to in the United States submission quoted in paragraph 39, the Group noted that, whereas alleged victims and/or eyewitnesses would be in a position to provide firsthand accounts, it could not overlook the fact that such accounts might be incomplete or distorted for several reasons, for example: (a) interpretation difficulties, (b) deficiencies in complete and accurate recollection of the events, (c) the absence of any similar previous experience and hence the lack of an adequate frame of reference for describing the events and (d) a possible desire on the part of those interviewed to promote allegations that chemical warfare agents were being used. Some of these aspects are reflected in the submission, but the Group still felt that it was not in a position to make a definite assessment of the veracity of the accounts given by alleged victims or eyewitnesses.

41. Regarding testimony of the second type, as listed in paragraph 39, the Group noted that, in the case of hearsay accounts, there was always a risk of distortion. An exception would be testimony of doctors and other medical personnel who had had the opportunity to carry out a medical examination of victims shortly after an alleged chemical attack. However, the submission of the United States of America did not identify any doctors who had carried out such early examinations.

42. With respect to testimony of the third type, the Group noted that it is often very difficult to assess the veracity of statements from defectors. Such persons may want to exaggerate their own importance by claiming to possess important information of a kind that is difficult for their interrogators to verify, or they may simply want to attract benevolent attention by telling what they believe their interrogators want to hear. On the other hand, defectors sometimes have unique possibilities for providing accurate information on events that otherwise would have remained undisclosed. However, without the opportunity of carrying out firsthand interviews with such sources of information, the Group of Experts was not in a position to pass judgement on their statements.

43. In the opinion of the Group, scientific evidence is especially significant in investigations, such as the one being conducted at present, provided that the origin of the samples can be verified and the integrity of the samples during handling and analysis can be safeguarded. Intact munition or remnants of used munition would constitute a highly convincing piece of evidence, as would samples from sites of attacks containing chemical compounds that are exclusively used as chemical warfare agents and without a natural occurrence. However, the scientific evidence referred to in the submission of the United States of America (A/37/157, annex) consisted mainly of findings of highly toxic compounds of a type whose natural origin, although very unlikely, could not be excluded in samples of uncertified origin.

44. The reliability of documentary evidence from open sources depends on the reliability of the original evidence upon which it is based, usually testimony of any of the first three types as referred to in paragraph 39, or scientific evidence mentioned in the same paragraph.

45. Regarding evidence based upon intelligence derived from "national technical means", the Group had to conclude that such evidence, for obvious reasons, was presented without identifying the sources or the means employed, thereby precluding any assessment of the validity or veracity of the information.

46. The Group of Experts took note that some of the points raised in paragraphs 68 to 71 and 73 in the previous report of the Secretary-General (A/36/613), were discussed and clarified in annexes D and E to the submission of the United States of America (A/37/157). However, despite the material presented in the submission, the Group was of the opinion that the possibility of a natural origin of the trichothecenes detected in the samples had not been completely ruled out.

47. One of the very few sources of information explicitly identified by name in the submission of the United States of America was a Dutch journalist, who allegedly not only filmed a part of a chemical attack in Afghanistan but also developed some symptoms that were attributed to exposure to chemical agents (see A/37/157, annex). In seeking further clarification and information concerning this matter, the Group learned that the symptoms were no longer present. Furthermore, the film itself, which was viewed by the Group, did not convey any relevant information. Accordingly, the Group deemed it unlikely that the journalist would be in a position to contribute to the investigation.

48. In the submission (A/37/157), it was alleged that chemical attacks against armed forces and civilian population had taken place in Thailand during March and May 1981. However, the Group noted that, in a letter dated 9 October 1981 concerning the visit of the Group of Experts to Thailand, the Royal Thai Government had stated that chemical weapons had not been used in Thailand itself.

49. After examining the United States submission (A/37/157), the Group of Experts felt that a number of points raised in the submission needed further clarification. A letter and an annexed questionnaire was, therefore, prepared by the Group and transmitted to the United States Government (see annex I). The reply to this letter and questionnaire was received from the United States in a note

verbale dated 7 October 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (Conference room paper 1/Add.12, discussed in paras. 76-80).

50. The Group of Experts studied the letters dated 27 April 1982 (A/37/210) and 28 April 1982 (A/37/212) from the Permanent Representative of the Lao People's Democratic Republic to the United Nations addressed to the Secretary-General, the second one containing complaints of alleged chemical attacks in Battambang Province in Kampuchea, and concluded that, in respect to these complaints, clarification and further information were needed. However, the Group was also cognizant of the reply by the Government of the Lao People's Democratic Republic, dated 31 August 1981, to the note verbale of the Secretary-General, dated 26 January 1981, in pursuance of resolution 35/144 C, the relevant part of which stated, inter alia, that:

"While continuing its efforts, together with all countries which value peace and security, towards the conclusion of an international treaty on the banning of chemical weapons, the Lao People's Democratic Republic reaffirms its unmovable opposition to resolution 35/144 C and categorically rejects the so-called 'Group of Experts' envisaged in that resolution."

51. The Group took note of the letter dated 20 May 1982 from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General (A/37/233) transmitting a "critique prepared by experts from the USSR Academy of Sciences, the USSR Ministry of Health and other competent Soviet organizations, of the report of the United States Department of State to the Congress of the United States entitled 'Chemical Warfare in Southeast Asia and Afghanistan', which has been circulated at the United Nations". Whereas the Group could accept some of the objections and explanations presented in the critique as being valid, it had some reservations with respect to some other points.

52. The Group agrees with the statement in the critique that mustard gas poisoning is characterized primarily by damage to the skin, eyes and respiratory tract, which takes a long time to heal, and thus the use of mustard gas can be proven by physical evidence. During its visits to Thailand and Pakistan, the Group did not come across any case exhibiting such characteristic symptoms.

53. The Group shares the opinion put forward in the critique that fungi of the genus Fusarium occur naturally in South-East Asia, and that these fungi might be able, under certain conditions, to produce toxins of the trichothecene type. However, the Group felt that it does not necessarily follow from this that the high trichothecene levels reported in the submission of the United States of America (A/37/157) probably would be of a natural origin.

54. The submission of the Union of Soviet Socialist Republics contained the following statement:

"Unequal contamination levels for different parts of the leaves are encountered only when contamination occurs naturally because the fungus population is unevenly distributed over the leaf surface." (A/37/233, annex)

With respect to that statement, the Group noted that the artificial dispersal of a particulate aerosol could also result in unequal contamination, for example, if some leaves were shaded by others.

55. In the same submission it was asserted that

"Unlike the American toxin VX, mycotoxins of the trichothecene group cannot produce toxic effects, let alone fatal intoxication, in humans by coming into contact with the skin." (A/37/233, annex)

56. By extrapolation from data published in scientific literature concerning animal experiments and assuming that no vast differences exist between humans and animals in respect of reaction to trichothecene mycotoxins, it can be concluded that percutaneous application of trichothecenes would indeed cause toxic effects, but that very large quantities would be required for a fatal outcome if administered only by the percutaneous route.

57. The critique (A/37/233, annex) advanced a theory that a natural occurrence of trichothecenes in the areas where the samples analysed by the United States of America were collected could be due to a spread of Fusarium spores from elephant grass infested areas in Viet Nam, and the subsequent appearance of fusariotoxicoses. This explanation, to be true, would require the occurrence of a series of events, each of which is of a low probability. Thus, in the opinion of the Group, this explanation is unlikely to be valid.

58. The Group also took note of the letters dated 3 December 1981 (A/C.1/36/16), 7 April 1982 (A/37/173) and 30 April 1982 (A/37/219) from the Permanent Representative of the Union of Soviet Socialist Republics to the United Nations addressed to the Secretary-General. Most of the points raised in these letters and attached annexes are also included in the critique discussed in paragraphs 51 to 57 of this report.

59. The Group was cognizant of the allegations in the above-mentioned three communications from the Soviet Union that chemical weapons manufactured in the United States of America were being used against the armed forces of the Democratic Republic of Afghanistan as well as against civilians in Afghanistan. The Group also took note of similar allegations made by the Representative of Afghanistan during the 53rd meeting of the First Committee at the thirty-sixth session of the General Assembly (A/C.1/36/PV.53, p. 41). In a letter dated 12 August 1981, transmitted to the Government of Afghanistan at the request of the Group, inquiries were made as to the possibility for the Group to undertake an on-site visit to Afghanistan in pursuance of operative paragraph 5 (b) of General Assembly resolution 35/144 C. No reply has been received to date.

60. The Group studied the note verbale dated 20 May 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General (A/37/234 and Corr.1), which contained information based on further analyses of blood and urine samples taken from victims of an alleged chemical attack within 24 hours of the alleged exposure. The Group concluded that the presence of T-2 and HT2 toxins in the blood and urine samples would be

consistent with a previous exposure of the victims to mycotoxins of the trichothecene type, but that it would be impossible to decide from the analytical results whether this exposure was due to a chemical attack or could be attributed to natural causes. Although the samples were taken less than 24 hours after the alleged attack, this would not preclude the fact that the trichothecene exposure could have taken place earlier. Furthermore, it was pointed out in the note verbale that the presence of T-2 toxin could be demonstrated in the blood more than two weeks after exposure. The Group took note that blood samples from control individuals of similar age and background had been analysed and found to be free of detectable quantities of trichothecene mycotoxins, and expressed the opinion that these results made the possibility of a natural origin of the trichothecene exposure extremely remote but that it could not be completely excluded.

61. The Group examined the note verbale dated 21 June 1982 from the Permanent Mission of Canada to the United Nations addressed to the Secretary-General (A/37/308), together with the annexed report concerning the possible use of chemical warfare agents in South-East Asia. It took note that the Canadian investigator had experienced many of the same shortcomings with respect to data collection as did the Group, in the course of its on-site visits in Thailand and Pakistan.

62. The Group agreed with the conclusion in the submission that many of the symptoms described were more consistent with stachybotryotoxicosis, a mycotoxicosis caused by macrocyclic trichothecenes, such as satratoxins, roridin and verrucarins, rather than with symptoms attributed to trichothecenes of either the vomitoxin type or the T-2 and diacetoxyscirpenol type (see A/37/308, annex II, appendix III). However, the symptomatology is usually vague and imprecise and, hence, any definite conclusions are impossible. Furthermore, stachybotryotoxicoses and other trichothecene toxicoses differ not only in terms of causative mycotoxins but also in terms of routes of mycotoxin introduction into the organism. Trichothecene toxicoses are usually due to ingestion of contaminated food but, in the case of stachybotryotoxicosis in man, there is an association with inhalation and percutaneous absorption of the toxins.

63. The Group noted with interest suggestions regarding procedures, made in the Canadian submission (A/37/308), which are designed mainly for investigations of allegations concerning the use of mycotoxins as chemical warfare agents.

64. The review on the natural occurrence of mycotoxicoses in Thailand, as contained in the submission, gives a good and succinct overview of this subject. It concludes that:

"Therefore, the findings of this report indicate that potential producers of trichothecenes exist in Southeast Asia, but that neither naturally occurring diseases due to these toxins occur, nor that there are any detectable levels of mycotoxins in the natural environment." (A/37/308, annex II, appendix IV)

In the opinion of the Group, this conclusion is probably valid for Thailand and surrounding countries but, on the basis only of the data presented, it is not possible to extend it to the whole region of South-East Asia.

65. The Group took note of the letters dated 25 June 1982 (A/S-12/AC.1/57), 5 August 1982 (A/37/376) and 6 August 1982 (A/37/377) from the Chargé d'Affaires a.i. of the Permanent Mission of Viet Nam to the United Nations addressed to the Secretary-General. These letters referred, inter alia, to a "Memorandum of the Ministry for Foreign Affairs of the Socialist Republic of Viet Nam on the U.S. criminal use of toxic chemicals in Viet Nam, Laos and Kampuchea" (see A/37/377, annex). This memorandum, as summarized in the letter dated 25 June 1982,

"... points out that during their war of aggression against Viet Nam, Laos and Kampuchea, as well as bombs and all sorts of armaments, the Americans used toxic chemicals and gases systematically and on a large scale. In South Viet Nam alone they spread more than 100,000 tons, over nearly all the provinces. About 13,000 square kilometres of cultivated land and 25,000 square kilometres of forests were touched: 43 per cent and 44 per cent respectively of the total area. And much of this land was sprayed more than once. These products destroyed 70 per cent of the coconut groves, 60 per cent of the rubber plantations, 110,000 hectares of coastal filao forest, 150,000 hectares of mangroves, and crops enough to feed millions of people. Out of two million Vietnamese people contaminated with these products, 3,500 deaths have been officially registered." (A/S-12/AC.1/57, annex)

Furthermore, in that letter it was stated, inter alia, that

"In 1966, when defoliation operations were being stepped up, a sharp increase in birth defects at the Pediatric Hospital in Saigon was noted. In 1969 the Saigon press shocked the public with reports of many molar pregnancies and of malformed babies born to healthy peasants in defoliated areas." (Ibid.)

"The massive and prolonged utilization of defoliants, besides permanent ocular lesions, can cause chromosomic alterations among a population obliged to cling to ancestral soil and these alterations can provoke among their progeny congenital malformations the importance of which remains to be determined." (Ibid.)

66. In its examination of the above-mentioned documents, the Group was, however, also aware of the reply of the Government of Viet Nam, dated 18 April 1981, to the note verbale by the Secretary-General dated 26 January 1981 which, inter alia, stated the following:

"At the thirty-fifth session of the General Assembly, the delegation of the Socialist Republic of Viet Nam, together with many other delegations, rejected this vicious political design and voted against resolution 35/144 C.

"The Socialist Republic of Viet Nam, in co-operation with other countries, is making great efforts to correctly assess and gradually overcome the consequences of the use of U.S. chemical weapons caused to the people and the environment of Viet Nam. However the Socialist Republic of Viet Nam will not engage in any activities in the framework of the ill-intentioned resolution 35/144 C."

67. Under the circumstances, the Group felt that it was unable to pursue any investigation of the allegations concerning the use of chemical weapons on the territory of Viet Nam.

68. The Group studied the letter dated 25 August 1982 from the Permanent Mission of Canada to the United Nations addressed to the Secretariat, together with the enclosed report entitled "An Epidemiological Investigation of Alleged CW/BW Incidents in SE Asia" (Conference room paper 1/Add.11). This report discussed six incidents: Toul Chrey (13 February 1982), Pailin (8 March 1982), Ban Sa Tong (19 February 1982), Ban Sub Tha Mau (19 February 1982), "Hmong incident" (25 November 1981) and Ban Kang Lord (3 March 1982).

69. In respect of the Toul Chrey incident, the Group shared the opinion put forward in the report that the only group of agents that would fit the symptomatology exhibited by the casualties from Toul Chrey (as described in the report) would be the incapacitating agents. All other classes of agents could be eliminated, including mycotoxins, unless mixtures of mycotoxins could produce the same symptoms as incapacitating agents.

70. As regards the Pailin and Ban Kang Lord incidents the Group felt that the number of alleged victims involved in these incidents (three and one respectively) was too small to allow an epidemiological evaluation and, therefore, it was not in a position to form a judgement on the conclusions in the report concerning these two incidents.

71. During its visit to Thailand in 1982, the Group carried out a number of interviews concerning the incidents at Ban Sa Tong and Ban Sub Tha Mau. On the basis of data presented in the report, as well as information obtained during the interviews conducted by the Group, it concluded that the inhabitants of the two villages had exhibited an uncommon level of minor illnesses shortly after the appearance of the yellow substance. As to possible causative mechanisms for this higher incidence of illnesses, the Canadian team could not identify any other factor common to all those affected except exposure to the "yellow substance" and the Group itself could not offer any other explanation.

72. The "Hmong incident" was not investigated in detail by the Group during its visit to Thailand in 1982 since the alleged victims were not identified by name in the Canadian submission. However, the Group met with a number of alleged victims and/or eyewitnesses who reported signs and symptoms closely resembling those listed in the submission. The Canadian report concludes, inter alia, that:

"The effects described are compatible with the postulated use of mycotoxins but are not similar to those of any other Group of chemical agents known to the team.

"Without confirmatory laboratory analysis the use of mycotoxins cannot be demonstrated unequivocally." (Conference room paper 1/Add.11)

In the opinion of the Group, this is a good assessment of the "Hmong incident" as reported by the Canadian team.

73. The Group concluded that the Canadian study (Conference room paper 1/Add.11) has demonstrated, in an impressive way, the usefulness of an epidemiological approach to investigations of alleged use of chemical weapons in situations when a timely access to areas allegedly subjected to attack is not possible.

74. The Group also studied the letter dated 7 September 1982 from the Permanent Mission of Canada to the United Nations addressed to the Secretariat together with a report entitled "Report on Possible Use of Chemical Warfare Agents in Southeast Asia" (Conference room paper 1/Add.11), dealing with interviews with refugees conducted at Ban Vinai on 5 May 1982.

75. During its visit to Thailand, the Group interviewed three of the four alleged victims referred to in the submission. The accounts of the alleged chemical attack in the vicinity of Phu He on 3 April 1982 obtained by the Group accord, in the main, with the interviews reported in the Canadian submission, with the exception of the number of alleged casualties involved. In the submission it is stated that:

"The witnesses claimed that a total of approximately eighty persons died in their villages, although the maximum seen by any one witness was sixteen deaths." (Conference room paper 1/Add.11)

During the interviews conducted by the Group, only one witness claimed to have seen one fatality resulting from the attack. The witness who, according to the submission, claimed to have observed 16 deaths, stated that this referred to 16 animals that died. A number of other smaller discrepancies between the interviews reported in the submission and the interviews carried out by the Group can probably be attributed either to difficulties in interpretation or to the fact that six months had elapsed between the two sets of interviews.

76. The Group examined the note verbale dated 7 October 1982 from the Permanent Representative of the United States of America to the United Nations addressed to the Secretary-General, which included attachments A to D (Conference room paper 1/Add.12), and also attachment E submitted on 15 November 1982 (Conference room paper 1/Add.13). In the submission it was suggested that United States experts on the question of the use of chemical weapons appear before the Group of Experts in order to supplement the information conveyed in the submission. Pursuant to that suggestion, the Group met with the United States experts on 15 November 1982, and the material presented during the meeting was taken into account in the evaluation.

77. The submission contains detailed descriptions of the methods used for trichothecene analysis. In the opinion of the Group, these methods are sufficient to ensure a correct qualitative identification and to give quantitative results with satisfactory precision and accuracy. The Group also noted that the recovery rate in some cases was low (less than 10 per cent) and that the quantitative data presented had not been adjusted for this.

78. Results of analysis of tissue samples, taken post-mortem from a man who died 31 days after an alleged exposure to a chemical warfare attack, are presented in the submission. The Group concluded that the very high trichothecene levels found in the samples are consistent with previous massive exposure to such toxins, and that the finding also of aflatoxin B1 in the samples makes it possible that this compound may have contributed to the fatal outcome by a synergistic effect.

79. The Group took note of statements made in the submission and during the above-mentioned meeting regarding the presence, in some samples, of synthetic compounds without a natural occurrence. Especially significant, in the view of the Group, is the finding of polyethylene glycol and lauryl sulphate in samples of yellow powder from Laos. However, the Group was not in a position to ascertain whether or not the samples originated from an area allegedly subjected to a chemical attack.

80. Points raised in the letter to the Permanent Representative of the United States of America to the United Nations, transmitted at the request of the Group, were clarified in the submission and, in this context, it was stated, inter alia, that:

"Many refugees from Afghanistan, Laos, and Kampuchea who have reported CW attacks are still in the camps in Pakistan and Thailand and are the responsibility of international refugee organizations. The U.S. has no jurisdiction over these people nor would it be proper for the U.S. to provide the names of the victims who are still in the camps without their permission. The same holds true for defectors, many of whom are under protective custody outside their homeland by other governments or have resettled under new identities. The Thai government, World Vision, voluntary assistance groups, as well as UN refugee organizations and the various Lao exile organizations with representatives in Thailand have files on chemical attacks and victims that could be made available to the UN Group of Experts." (Conference room paper 1/Add.12)

Acting upon that suggestion, the Group explored the possibility of obtaining access to files on chemical attacks and, at Ban Vinai, files kept by a representative of World Vision were made available to the Group (see para. 142).

81. The Group concluded that the final evaluation of the written submissions concerning alleged use of mycotoxins of the trichothecene type as chemical warfare agents in South-East Asia, would depend upon seven basic parameters:

- (a) Reliability of the accounts of alleged chemical attacks;
- (b) Possibility of trichothecenes being the causative agents for the medical signs and symptoms reported by alleged victims and medical personnel;
- (c) Origin of the physical samples;
- (d) Origin of the medical samples;

(e) Handling of the samples;

(f) Reliability of the analytical procedure;

(g) Possibility of a natural occurrence of trichothecenes in such places and quantities that could explain observed medical signs and symptoms as well as analytical findings.

82. The reliability of accounts of alleged chemical attacks is discussed in paragraph 40.

83. Many of the medical signs and symptoms reported by alleged victims and medical personnel could be explained by trichothecene poisoning, whether due to natural occurrences or other causes. However, because of the imprecision and vagueness of the symptomatology in most reports, it is not possible to exclude other explanations.

84. With respect to the origin of the physical samples, the Group felt that whereas it would not wish to question, on an a priori basis, that the samples were collected in the areas specified in the submissions, it nevertheless had to conclude that it was impossible to ascertain beyond a reasonable doubt as to whether or not these samples were obtained from areas which were exposed to chemical attacks. Likewise, the Group arrived at similar conclusions regarding the origin of the medical samples.

85. Regarding the handling of the samples, the written submissions contained virtually no information. Consequently, the Group was not in a position to form an opinion on the possibility of any undue interferences during the handling of the samples.

86. As to the analytical procedures, the Group felt that the precision and accuracy were sufficient for the purpose of identifying significant trichothecene levels.

87. With respect to the possible natural occurrence in Laos and Kampuchea of high concentrations of trichothecenes, the Group noted that conflicting opinions were presented in some of the submissions. Thus, in some submissions it was suggested that the types and levels of trichothecenes reported by the United States of America to be present in samples from Laos and Kampuchea could have a natural origin, whereas other submissions suggested that the levels and combinations of individual compounds indicated that the contamination would not be natural. Without access to further data, the Group was not in a position to form an opinion on this matter, but took note that, in the scientific literature studied by the Group, it had not come across any report of a natural occurrence of trichothecenes of the vomitoxin type or of the T-2 and diacetoxyscirpenol type in a concentration exceeding 50 ppm (parts per million) in any of the areas surveyed for this purpose.

V. ON-SITE COLLECTION AND EXAMINATION OF EVIDENCE

A. Visit to Pakistan

88. In accordance with operative paragraph 5 (b) of General Assembly resolution 35/144 C regarding collection and examination of evidence, including on-site with the consent of the countries concerned, to the extent relevant to the purposes of the investigation, the Group discussed a visit to Pakistan following the receipt of a letter dated 23 October 1981 from the Permanent Representative of Pakistan to the United Nations in which he conveyed his Government's willingness to accord the necessary co-operation for the purpose of on-site investigation in accordance with paragraph 5 (b) of resolution 35/144 C. Having earlier decided to consider the question of a possible visit to Pakistan, and following consultations with the Chairman and the other members of the Group, it was decided that the Group would undertake the visit to Pakistan concurrent with its fourth session. In that context, following a request made to it, the Group met with representatives of the Permanent Mission of the United States to the United Nations Office at Geneva, who supplied the Group with names of alleged victims and eyewitnesses who could be located in Pakistan. At Geneva, the Group also met, at his request, with an Afghan physician who provided a few names of some possible contacts among the Afghan refugees in Pakistan.

89. The Group of Experts visited Pakistan from 9 to 22 February 1982. The members of the Group of Experts were Major-General Dr. Esmat Ezz (Chairman), Dr. Edward E. Ambeva and Dr. Humberto Guerra. The Group of Experts was also accompanied by members of the Secretariat staff: Mr. Sohrab Kheradi, Senior Political Affairs Officer (Secretary of the Group), Mr. Boiko Tarabanov, Political Affairs Officer (Deputy Secretary of the Group), Mr. Johan Santesson (Consultant) and Miss Margaret Headley (secretary to Mr. Kheradi). In addition, the officers from the United Nations Development Program (UNDP) and the Director of the United Nations Information Centre at Islamabad provided all the necessary facilities and assistance to the Group during its visit in Pakistan. Furthermore, the Office of the United Nations High Commissioner for Refugees (UNHCR), including its local officers, assisted the Group during its visit to Peshawar and Quetta. The Group also visited the International Committee of the Red Cross hospital at Peshawar.

90. At each stage of its work in Pakistan, the Group was accorded every possible assistance from the Government of Pakistan and the local authorities, including means of transportation and security. Upon arrival, the Group had a briefing by the Additional Foreign Secretary as well as other officials of the Ministry for Foreign Affairs and of the Ministry of the States and Frontier Regions. Furthermore, at Islamabad the Group also met with representatives of the United States Embassy, at the latter's request, who wished to provide background information on the subject.

91. At Peshawar, the Group was briefed by the Pakistan High Commissioner for Afghan Refugees for the purpose of planning the details of the visit to Peshawar. On the basis of an itinerary provided by the Pakistan authorities, the Group then proceeded to carry out collection and examination of evidence in refugee camps, refugee hospitals and at headquarters of the political organizations of the refugees at Peshawar.

92. Every effort was made to meet with and interview anyone who claimed to have been a victim of or an eyewitness to a chemical attack, as well as others who claimed to have relevant information on the subject. During its visit to refugee hospitals and headquarters of refugee political organizations, the Group also interviewed medical personnel who claimed to have knowledge of victims of alleged chemical attacks. Summaries of statements made during interviews are presented in annex V and a general evaluation of the interviews appears in paragraphs 116-157.

93. The Group had a meeting with a representative of the United Nations High Commissioner for Refugees at Peshawar. The representative stated that, during the two years he had been at Peshawar, he had not come across any chemical casualties. He pointed out, however, that seriously wounded people did not stay in the refugee villages but went directly to the hospitals at Peshawar.

94. The Group also visited the hospital at Peshawar operated by the International Committee of the Red Cross. Representatives of the hospital informed the Group that they had not come across any cases which could be attributed to a chemical attack.

95. Also at Peshawar, the Group met with representatives of the Consulate of the United States of America, at the latter's request, who provided the Group with background information as well as a few names of persons who might possess some relevant information regarding the alleged use of chemical weapons.

96. During its visit to Peshawar the Group received various samples allegedly involved in chemical attacks. Further details of these samples are included in section VI below and in annex III. Some of those who were interviewed, inter alia, at headquarters of refugee political organizations claimed to have had access to relevant samples in Afghanistan and indicated that they would try to bring these samples to Pakistan and hand them over to the local United Nations representative for further transmittal to United Nations Headquarters in New York. Inquiries directed to the United Nations office at Islamabad revealed that, as at 2 November 1982, no such samples had been received.

97. At the conclusion of its investigations at Peshawar, the Group decided also to undertake similar collection and examination of evidence at Quetta, another major centre for refugees in Pakistan, in order to make its investigation more comprehensive.

98. At Quetta, the Group met with the Pakistan High Commissioner for Refugees in Baluchistan and with a representative of the United Nations High Commission for Refugees. The Group also visited government and refugee hospitals and made attempts to meet with doctors who were said to have treated cases of chemical casualties. Furthermore, the Group met with a few alleged victims of chemical attacks and persons who claimed to have been eyewitnesses to chemical attacks.

99. The Group was unable to derive any important evidence at Quetta, despite its own efforts and the full assistance given to the Group locally. Before the visit, the Group had been given the names of a few persons at Quetta who were said to be in possession of relevant information, but the Group was unable to locate those persons.

100. In the course of its on-site investigation in Pakistan, the Group was handicapped by various difficulties with respect to data collection, of which the most significant were the following:

(a) The Group was inconvenienced in its efforts at carrying out adequate cross-examination of the alleged victims and eyewitnesses due to intervention and promptings by leaders of political refugee organizations who were present at the interviews;

(b) In some cases, the interviews were conducted after a considerable lapse of time following an alleged chemical attack, thereby resulting in the disappearance of most of the signs and symptoms that might have been present and adversely affecting the recollection of the events;

(c) The Group noted that some of the people interviewed were not fully oriented towards providing quantifiable information, such as time and distances, which might have helped the Group in reaching accurate assessments.

(d) Many of the alleged eyewitnesses had gone back to Afghanistan and could not be reached.

B. Visit to Thailand in 1982

101. The Group of Experts visited Thailand from 25 October to 10 November 1982. The members of the Group were: Major-General Dr. Esmat Ezz (Chairman), Dr. Edward E. Ambeva and Colonel Hugo Javier. The Group was also accompanied by members of the Secretariat staff: Mr. Sohrab Kheradi, Senior Political Affairs Officer (Secretary of the Group), Mr. Boiko Tarabanov, Political Affairs Officer (Deputy Secretary of the Group), Dr. Johan Santesson (Consultant) and Miss Margaret Headley (secretary to Mr. Kheradi). In addition, the officials from the Economic and Social Commission for Asia and the Pacific (ESCAP) provided all the necessary facilities and assistance to the Group during its visit in Thailand. The local officers of UNHCR assisted the Group during its visit to some of the refugee camps.

102. At each stage of its work in Thailand, the Group was accorded all the necessary assistance from the Government of Thailand and the local authorities, including means of transportation and security. Upon arrival, the Group had a meeting with the Secretary-General of the National Security Council and was briefed by officials present at the meeting. Permission from the Government of Thailand to bring into the country spiking material for the preparation of control samples, if necessary, was granted following a request to that effect from the Chairman of the Group of Experts.

103. The Group had a meeting with the Rector of Mahidol University at Bangkok and interviewed Thai scientists from the faculty of medical technology and other departments of the university regarding "the examination of the yellow spot samples collected from Thailand border close to Cambodia". On the same subject, the Group also met with officers of the Chemical Department of the Royal Thai Army. The Group also visited the Pong Nam Ron area of Chantaburi Province and interviewed inhabitants of the villages of Ban Sa Tong and Ban Sub Tha Mau in connection with some yellow substance reported to have been observed in the area.

104. During its visit to Thailand, the Group carried out collection and examination of evidence in the two refugee camps of Nong Kai and Ban Vinai, close to the territory of Laos, and in the refugee processing centres and refugee camps of Sa Kaeo (Ban Kaeng), Nong Chan and Kao I Dong, closer to Kampuchea. It also went to the border area at Nong Pru with the purpose of interviewing Kampuchean displaced persons (see para. 108). The proposed visits to Kamput and Panatnikhom processing centres did not materialize, as the Group was subsequently informed by the Thai authorities that nothing of relevance to the investigation could be obtained there.

105. The Group interviewed, in person, alleged victims and eyewitnesses of alleged chemical attacks. Summaries of the statements made during the interviews are presented in annex VI and a general evaluation of the interviews appears in subsection D.

106. During its visits to the above-mentioned refugee holding and processing centres, the Group also interviewed medical personnel. The Group collected some blood and urine samples and received, as well, physical samples consisting of some pieces of leaves with yellow spots, some brownish-grey granular matter and leaves with yellow spots said to originate from Kampuchea, as well as water sample and serum samples.

107. In the course of its on-site visit, the Group was handicapped by various difficulties with respect to data collection, of which the most significant were the following:

(a) Difficulty of conducting meaningful interviews through interpreters, for example, from Kampuchean and Hmong into Thai and from Thai into English and vice versa, adversely affected the efficiency and accuracy of the interviews, although the lack of technical training of the interpreters was compensated, to some extent, by the help of an officer from the Chemical Department of the Royal Thai Army;

(b) In most cases, the interviews had to be conducted after a considerable lapse of time following an alleged chemical attack, thereby resulting in the disappearance of most of the signs and symptoms that might have been present, and adversely affecting the accurate recollection of the events;

(c) Some of the people interviewed were not fully oriented towards providing quantifiable information, such as time and distance, which could assist the Group in reaching accurate assessments.

108. In connection with the above-mentioned visit to Nong Pru in Chantaburi Province for the purpose of interviewing Kampuchean displaced persons, the Group was taken to the border area and was met, however, by officials of Democratic Kampuchea on Thai territory, who invited the Group to cross the border for an on-site visit. However, the Chairman of the Group explained to those officials that, since a reply from Democratic Kampuchea had not been received to the letter of 27 August 1982 conveying the Group's specific inquiries concerning security and logistical aspects of an on-site visit to Democratic Kampuchea, and to the questionnaire attached to the letter, the Group would not be in a position to undertake the visit at that time. In the course of that meeting, assurance was given by those officials that the matter would be pursued as requested by the Chairman. Subsequently, following a request conveyed by officials of Democratic Kampuchea through local Thai authorities, the Group decided to interview, on Thai territory, alleged victims and eyewitnesses from Democratic Kampuchea.

109. During its stay in Thailand, the Group of Experts devoted considerable time and effort in pursuing the question of an on-site visit to Democratic Kampuchea. It was initially the decision of the Group not to undertake such a visit unless a written reply to the specific inquiries raised in its letter of 27 August 1982 and the questionnaire attached to it were transmitted to United Nations Headquarters. In this connection, since its arrival in Thailand, the Group made strenuous and sustained efforts to establish contact with the Permanent Representative of Democratic Kampuchea to ESCAP in view of the fact that the Group was informed that Democratic Kampuchea does not have diplomatic representation in Thailand.

110. On 6 November 1982, the Group, after protracted efforts, finally succeeded in arranging a meeting at ESCAP with the Permanent Representative of Democratic Kampuchea to ESCAP, at which time the latter notified the Group that the letter of 27 August 1982 and the annexed questionnaire had been brought to his attention by his Vice-President only the previous day and that he would arrange for a reply from his Government to reach United Nations Headquarters by Sunday, 7 November 1982. Failing to obtain that reply, the Group subsequently decided that it would also be willing to consider a response through the Permanent Representative of Democratic Kampuchea to ESCAP. Meanwhile, the Group decided to obtain visas for Democratic Kampuchea in order to be ready for an on-site visit. However, despite repeated attempts by the ESCAP officials concerned, it proved impossible to establish any further contact with the Permanent Representative of Democratic Kampuchea to ESCAP. Therefore, taking into account the fact that the original communication to Democratic Kampuchea had been sent out as early as 27 August 1982 and that various attempts had been made during its stay in Thailand to facilitate a possible on-site visit to Democratic Kampuchea, and taking note, furthermore, of the intense time-pressures for the finalization of the Group's report and, finally, in view of the fact that no response had been forthcoming from any source as of midnight, 9 November 1982, the Group of Experts took a decision to depart for New York on 10 November 1982 and notified United Nations Headquarters about its decision.

111. Subsequently, however, on the basis of a communication, received from New York on 10 November 1982 at 04.45 a.m. which did not contain answers to the Group's specific inquiries but only a brief general reply (see annex I) to its letter and questionnaire of 27 August 1982, the Group decided to postpone its departure from Thailand by another 24 hours in order to try to re-establish contact with the Permanent Representative of Democratic Kampuchea to ESCAP with a view to obtaining more complete and detailed information concerning the queries raised in the above-mentioned letter and questionnaire, as well as an itinerary of a possible visit to Democratic Kampuchea.

112. During a subsequent meeting of the Group, an ESCAP official called the residence of the Permanent Representative of Democratic Kampuchea to request him to meet with the Group in order to discuss matters related to questions raised in the letter of 27 August 1982 and the attached questionnaire. He was informed by the official that this would not be possible since the Permanent Representative of Democratic Kampuchea was not available. The ESCAP official, therefore, conveyed the Group's request to meet with any official representative of Democratic Kampuchea to ESCAP in order to discuss the matter. The response, once again, was that this was impossible since he himself had to attend another meeting and the Permanent Representative was unavailable. At that point, the Chairman of the Group directly requested the official from Democratic Kampuchea for a meeting with any official of Democratic Kampuchea to ESCAP, in order to discuss the itinerary as well as related matters regarding the on-site visit to Democratic Kampuchea, which should take place as soon as possible. The official stated that he was not authorized to meet with the Group without specific instructions from his Government and suggested that the Group should proceed directly to the border to meet with the officials of Democratic Kampuchea who had met the Group on 30 October 1982 in Nong Pru. Upon an inquiry from the Chairman as to what arrangements could be made for such a meeting and as to why it was not possible to discuss relevant matters with the official representative of Democratic Kampuchea to ESCAP, the answer given by the official was that he was not authorized by his Government to discuss such matters with the Group.

113. In the course of the meeting of the Group, in connection with a point raised in the communication from Democratic Kampuchea (see annex I), the Group noted that it was not aware of any information being conveyed, during the meeting with Democratic Kampuchea officials at the border on 30 October 1982, with respect to the specific queries regarding alleged chemical attacks, raised in the letter of 27 August 1982 and the attached questionnaire.

114. In view of the entire sequence of events and all aspects and developments concerning this question, it became clear to the Group that the matter could not be constructively pursued any further at that stage and the Group, therefore, decided that it had no choice but to depart for New York in order, inter alia, to complete its report.

115. After its return to New York, the Group met with the Permanent Representative of Democratic Kampuchea in order to discuss his letter dated 9 November 1982 addressed to the Secretary-General. The Chairman of the Group apprised him of the developments with respect to the question of an on-site visit to Democratic Kampuchea and, in that connection, stressed the fact that the Group had spared no effort in trying to ensure that its visit to Democratic Kampuchea would materialize satisfactorily. In response, the Permanent Representative of Democratic Kampuchea pointed out that the main obstacle that had prevented the Group from carrying out its on-site visit in Democratic Kampuchea had been the technical difficulties encountered in making the necessary arrangements to facilitate such a visit and, in that context, cited, inter alia, logistical problems including those related to maintaining regular channels of communication, due to the hostilities prevailing in Kampuchea. Further, he expressed the hope that the mandate for the Group's activities would be extended and that the experience gained from the situation that had transpired would be usefully applied to a future on-site visit to Democratic Kampuchea.

C. General evaluation of the interviews in Pakistan

1. Reliability of information

116. Those who were interviewed can mainly be categorized in three groups:

- (a) Leaders of various Afghan groups;
- (b) Medical doctors who had treated victims of alleged chemical attacks;
- (c) Alleged victims or eyewitnesses of such attacks.

117. The Group did not find any reason to doubt the integrity of those who were interviewed. On the other hand, it could not overlook some facts. The information given by the leaders was based on hearsay. The testimonies presented by the alleged victims and eyewitnesses referred to observations made in the course of alleged chemical weapons attacks and hence under conditions of extreme stress, which might result in incomplete or distorted information. Furthermore, it was difficult to determine the objectivity of alleged victims or witnesses.

2. Technical aspects

118. The testimonies referred to three forms of chemical attacks besides allegations of water or grain poisoning and those concerning the use of some chemicals on dead bodies. The three main forms of alleged chemical attacks reported were:

- (a) Attacks on the karez (see para. 119) by some sort of chemical agents in order to flush out those who had taken shelter inside;

(b) Aerial attacks by airplanes or helicopters: (i) dropping bombs with or without parachutes, which would explode before or after reaching the ground, producing gas or smoke of various colours and in some cases incendiary effects, and (ii) spraying of some sort of substances which may or may not produce an incendiary effect;

(c) Artillery attacks, resulting in the production of various forms of smoke or gas.

(a) Attacks on karez

119. A karez is an underground water canal used for irrigation purposes. At more or less regular intervals, there are vertical air shafts leading down to the karez. 3/ An unspecified chemical agent was said to have been introduced either directly through the air shafts or through pipes. In the latter case, the pipes were said to have been introduced either by drilling holes in the ground or through the existing air shafts. A few alleged witnesses described the alleged chemical agent that was poured directly into the air shafts as a greenish liquid that reacted rapidly with water, resulting in the evolution of a gas.

120. Some reports referred to alleged chemical attacks upon people seeking shelter in the karez. An unspecified chemical agent was said to have been introduced either directly through the air shafts or through pipes. In the latter case, the pipes were said to have been introduced either by drilling holes in the ground or through the existing air shafts. A few alleged witnesses described the alleged chemical agent that was poured directly into the air shafts as a greenish liquid that reacted rapidly with water, resulting in the evolution of a gas.

121. The symptoms reported from the alleged chemical attacks on the karez included eye affections, respiratory difficulties, skin irritation, vomiting and unconsciousness. Even a few fatal cases were reported by some witnesses. In some cases, witnesses said that the effects could be more or less avoided by breathing through a wet piece of cloth or by submerging their heads under water for a short while.

122. Based on the accounts, it is the opinion of the Group that the attacks on the karez were not carried out by the use of high explosives or incendiary weapons, but conform with the use of some form of harassing agent. Except for the prolonged unconsciousness that was reported in some cases, the symptoms reported were similar to what would be expected from the use of a harassing agent of the adamsite type in a confined space. If the chemical agent had a very low vapor pressure, and hence had to be disseminated as a particulate aerosol (as in the case of adamsite), breathing through a wet piece of cloth might offer some protection, as was reported.

(b) Aerial attacks and artillery attacks

123. A number of testimonies referred to bombs or shells that exploded before or after reaching the ground, producing gas or smoke of different colours, with or without explosions and incendiary effects. This pattern might be related to the use of high explosives, incendiaries or chemical ammunitions.

124. The smoke or gas produced may be categorized as follows:

(a) Black smoke. Some testimonies referred to a black smoke that was highly irritating to the eyes and the upper respiratory tract. In some cases it was claimed that the smoke rendered the alleged victims unconscious for many hours. Breathing through a wet handkerchief offered some protection against the effects. The smell was unpleasant, "like burning rubber". According to some witnesses, the smoke was evolved from cylindrical bombs (1,000 mm height, 300 mm diameter) that were dropped by parachute from helicopters. The bombs were said to contain an orange-yellow powder mixed with some metal flakes. When the bombs hit the ground, they ignited and the black smoke was evolved. According to some witnesses, the bombs also caused extensive fires. In the Group's opinion, these "black smoke bombs" might be primarily incendiary weapons and the irritating smoke would then be a by-product of the combustion process. The possibility of a combination of a chemical warfare agent and an incendiary is remote since the high temperature produced by combustion would cause extensive decomposition of any agent.

(b) Orange powder. Some testimonies referred to the use of an "orange powder" that was said to give an orange hue to the ground and vegetation in the area. This might have resulted from incendiary bombs that burst on impact without igniting. Although one account mentioned the deaths of some animals being caused by the orange powder, no other clear references to direct toxic effects of the orange powder were made.

(c) Smoke and particles of various colours. Some testimonies referred to bombs that produced coloured smoke (for example, "blue turning red", "green", "green and blue", "milky"). The main effect produced by the smoke was said to be unconsciousness for several hours; in two cases also some form of paralysis was reported. In three cases there were allegations of the delivery of chemical agents by artillery. The resulting smoke was described as "white", "black turning yellow", or "black" and having an offensive smell. The medical effects were said to include lachrymation and vomiting. One witness described "star-like particles" which were emitted from a bomb dropped from an aircraft. The particles were said to cause fire when they hit the ground. No significant toxic effects were reported. In the opinion of the Group, this testimony would indicate the use of an incendiary weapon.

125. The Group was not able to reach any conclusions on the above allegations. Neither the samples of remnants of delivery systems nor those of the alleged chemical agents were available.

(c) Poisoning of water, food and grains

126. In two cases, hearsay accounts on poisoning of running water supplies were presented. Taking into account the dilution factor associated with running water and the amount required to establish an effective toxic concentration, the Group felt that these testimonies were not significant.

127. Some witnesses alleged that food and grains had been poisoned. Three types of stories were related in that respect:

(a) Mujahideen who had been invited to dinner with the local population were said to suffer from food poisoning after consuming the meal;

(b) Wheat grown in areas subjected to alleged chemical attacks was said to yield a poisonous crop even months later, although by washing the grains and drying them the supposedly toxic compound could be removed;

(c) Soviet soldiers were said to contaminate grains with some kind of powder that would make the grains toxic.

128. Only hearsay accounts were given regarding poisoned meals. In view of the insufficient evidence, the Group was not in a position to form a definite opinion on these stories.

129. As regards the poisonous wheat grains, the Group is aware of the fact that, if a chemical warfare agent is to be translocated from the soil to the grains in such quantities as to make the grains toxic, extremely large quantities of very stable agents (or agents with toxic degradation products) would be needed.

130. Concerning the contamination of grains with some kind of powder, the Group obtained only hearsay accounts and is not in a position to pass judgement on such allegations.

(d) Rapid decomposition of bodies

131. According to a belief among the Muslim Afghan population, the body of a warrior who dies fighting in a holy war (jihad) would not decompose for a long time. Some witnesses described the alleged use of a lethal chemical agent that would not only kill but also induce rapid deterioration of the dead bodies. Others claimed that a white-grey powder that was spread on the bodies of dead Mujahideen would cause the same kind of rapid deterioration. One witness claimed that the hair on the corpses became loose and fell off after 10 minutes; many witnesses claimed that the flesh "softened up", "became cheesy" and would come loose from the bones if the corpses were handled, usually within 6 to 24 hours. It was stated that the reason for the alleged use of agents of this type would be to demonstrate to the civil population that the Mujahideen are ordinary humans.

132. These statements are difficult to reconcile with known facts about the effects of chemical warfare agents or other chemical compounds. The Group is not aware of the existence of any chemical compound that would have the effects described in the statements.

3. Medical Aspects

133. During the on-site visit to Pakistan, the Group met with and interviewed physicians, other medical personnel and alleged victims and eyewitnesses. The Group also examined some of the victims who claimed to be suffering from persistent symptoms attributed to their alleged exposure to chemical agents. The Group also examined the medical records of alleged victims, when they were available, in the hospitals it visited.

(a) Interviews with medical personnel

134. There were three categories of such interviews: (a) those who had attended the Mujahideen in Afghanistan during combat; (b) those who were attending the Mujahideen in Pakistan at treatment centres manned by Afghan and/or Pakistani personnel; (c) International Committee of the Red Cross personnel stationed at Peshawar.

135. Physicians and male nurses who had been attending Mujahideen related medical histories, including signs and symptoms suggestive of the use of harassing agents and incendiaries, for example, lachrymation and upper respiratory tract involvement following exposure in enclosed spaces such as the karez.

136. Some of the medical histories and symptomatology presented to the Group did not conform with the clinical picture of the pathology described. For example, a man was diagnosed as having squamous cell carcinoma of his left hand. This pathology was attributed to the effects of an unspecified chemical warfare agent. The Group felt that such a correlation was extremely unlikely. The Group also found it impossible to believe that some camels and dogs had developed rabies as a result of chemical attack.

137. Physicians at Peshawar and Quetta attending victims of alleged chemical attacks related a common experience of seeing such patients weeks or months after the alleged exposure and were therefore able to discuss only those cases where persistent symptoms were present. The Group met with nine patients who claimed to have persistent eye affections caused by exposure to chemical agents and decided to hold consultations with an eye specialist at Peshawar. This consultant was of the opinion that their complaints could not be directly attributed to any specific chemical warfare agent but were cases of unspecified allergies.

138. International Committee of the Red Cross personnel stationed at Peshawar stated that, in the course of their work, they had not come across any alleged victims of chemical attack.

139. At Quetta, the Group tried to locate two persons with cases of eye affections that were said to have been caused by alleged chemical attacks. Their names had been given to the Group by an Afghan doctor at Geneva (see para. 88). The Group was unable to locate them but had the opportunity to interview the eye specialists who were said to have treated them. However, the latter stated that they had only attended to cases of blast injuries.

140. The few and scanty medical records available on the alleged victims interviewed were devoid of any specific information concerning injuries by chemical agents. However, most of them claimed to have been attended to in Afghanistan before crossing over into Pakistan. Most of the in-patients in the hospitals visited were victims of war injuries attributed to gunshot wounds and blast injuries (see table I in annex V for a summary of complaints obtained in interviews with alleged victims in Pakistan).

D. General evaluation of the interviews in Thailand

1. Reliability of information

141. Those who were interviewed can mainly be categorized in three groups:

- (a) Medical personnel who had treated victims of alleged chemical attacks or otherwise attended refugees;
- (b) Leaders of various refugee groups;
- (c) Alleged victims or eyewitnesses to attacks or incidents allegedly involving the use of chemical warfare agents.

142. The Group did not find any reason to doubt the integrity of those who were interviewed. On the other hand, it could not overlook the fact that it was difficult to determine the objectivity of alleged victims or witnesses. The Group had access to files maintained by World Vision containing medical records for some of the alleged victims interviewed by the Group at the Ban Vinai refugee camp. These records contained, inter alia, brief summaries of earlier interviews, carried out by personnel at the camp, relating to alleged chemical attacks. In many cases, there were clear discrepancies between the earlier statements as summarized in the medical records and the testimonials obtained by the Group.

2. Technical aspects

143. The testimonies can be categorized in three groups according to the respective geographical areas where the alleged use of chemical warfare agents was said to have taken place:

- (a) Testimonies referring to Kampuchea;
- (b) Testimonies referring to Thailand;
- (c) Testimonies referring to Laos.

(a) Alleged attacks in Kampuchea

144. The testimonies may be characterized as follows:

(a) Artillery shelling. Some testimonies referred to alleged delivery of chemical agents by artillery of various or unspecified calibre. The shells were said to have exploded at various distances from the alleged victims, ranging from 2 to 50 metres. The resulting "smoke" or "gas" was described as being "blue" or "yellow and white". Hearsay accounts concerning "yellow and green smoke" were also given. The Group considered it possible that the artillery shelling as described in the above accounts, could relate to the use of high explosives or screening smoke. Neither remnants of delivery systems nor samples of the alleged chemical agents were available.

(b) Mines. One testimony referred to the alleged dissemination of a chemical warfare agent from a land mine. It was stated that "the explosion of the mine delivered smoke only but produced no fragmentation". The smoke was described as "blue and green". The Group was not able to reach any conclusion on this allegation due to the insufficient nature of the information conveyed.

(c) Poisoned water. Three alleged victims related that they became ill after drinking water from streams; two of them referred to the same incident. The incidents were said to have occurred during the dry season, and it was stated that the water in these streams was almost or completely stagnant. In one case, nothing was said regarding when and how the alleged toxic material had actually been introduced into the water. In the other case, the two alleged victims reported observing an aircraft flying in the vicinity of the water source on the afternoon of the day prior to the alleged poisoning. Following the alleged incident they noticed "yellow powder" on leaves, stones and ground in the area surrounding the water source. With respect to the incidents involving the alleged poisoning of water sources, the Group concluded that the accounts related did not in any way establish that the reported occurrence of signs and symptoms, after consumption of water, had been preceded by the introduction of a toxic material into the water source.

(b) Incidents in Thailand

145. Testimonies given to the Group in the Thai villages of Ban Sa Tong and Ban Sub Tha Mau referred to the appearance of a yellow powder on roofs, walls, water jars, foliage and ground shortly after an aircraft flew over the villages. The descriptions given of the powder as "yellow spots" corresponded with what the Group observed from the film shown to the Group at "Channel 7" studio, said to have been shot in Ban Sa Tong a few hours after the alleged incident.

146. Some of those interviews also stated that samples of the yellow powder had been collected. According to information obtained by the Group at Mahidol University and the Chemical Department of the Royal Thai Army, some of those samples had been analysed. At Mahidol University it was reported that they had not detected any trichothecenes in the samples, using thin layer chromatography as the analytical method, but that they had isolated the potentially trichothecene-producing fungus Fusarium semitectum var. semitectum from two out of 22 samples. At the Chemical Department of the Royal Thai Army it was stated that, in preliminary analysis by thin layer chromatography, they had observed spots with a chromatographic behaviour similar to that of some trichothecenes, but that they had been unable to confirm these results.

147. As regards the above incidents, in the opinion of the Group, the presence, in the two villages, of a yellow powder of uncertain composition has been proven, but no convincing evidence has been presented as to how this material was disseminated.

(c) Alleged attacks in Laos

148. Most of the testimonies in this category referred to the appearance of unusual yellow spots on leaves, ground, vegetables, and so on, and even on clothing and exposed skin shortly after the passage of an aircraft. In many cases, the persons involved only heard the passage of an aircraft but did not visually observe the aircraft. A few testimonies only referred to the sudden appearance of yellow spots without the mentioning of any aircraft or other delivery system. Very few of those interviewed claimed to have observed an actual dissemination of material from an aircraft. Some described the material that appeared suddenly as originally liquid and in the form of drops that would rapidly evaporate upon contact with skin, ground or vegetation and leave a yellow residue. It is the opinion of the Group that most of the above testimonies, if true, could be explained by an aerial dissemination of drops having a diameter of one or a few millimeters, consisting of a solution or suspension of an involatile solid in a volatile liquid. Such falling drops, due to their kinetic energy, would penetrate clothing (except for very heavy fabrics and impermeable materials). Toxic effects, if any, could be associated with the liquid or the solid material or both.

3. Medical aspects

149. During the on-site visit to Thailand in 1982, the Group met with and interviewed physicians, other health personnel, alleged victims and eyewitnesses. The Group also examined some victims who claimed to have persistent symptoms as a result of exposure to chemical agents, either directly during alleged attacks or afterwards by eating contaminated food or drinking polluted water. Furthermore, the Group consulted with the head of the Thai Institute of Dermatology in order to obtain a specialist's opinion regarding two patients. The Group also examined the medical records available in the camps and examined and analysed the medical register of Ban Sa Tong Village Health Centre in Thailand. This village was allegedly affected by a yellow substance on 19 February 1982 and the medical register included data on monthly attendance and frequency of complaints during the period of mid-February through May 1982 (annex VI, table 1).

(a) Interview with medical personnel

150. There were four categories of such interviews:

- (a) Medical staff at the various camps;
- (b) One doctor who claimed to have been taking care of the alleged victims inside Kampuchea;
- (c) Village health officers in two Thai villages, allegedly exposed to a yellow substance;
- (d) Head of the Institute of Dermatology at Bangkok and another dermatologist from Pramongkutklao Hospital at Bangkok.

151. The camp physicians interviewed differed in their views. Some stated that they had never come across cases that could be attributed to an exposure to chemical warfare agents. Others mentioned that they had come in contact with many patients that claimed to have been exposed to chemical attack and had examined them in order to assess the underlying cause but were unable to reach a definite conclusion. The most striking complaints were skin rash, respiratory affections and diarrhoea with or without blood and vomiting. Two physicians at Ban Vinai Camp had prepared a questionnaire that was said to be used for every case that claimed to have been exposed to chemical attack. The completed questionnaire included a summary of the attack, the effects reported and the medical examination. In many cases, the Group noticed a divergence between the accounts as related to the Group and the corresponding information contained in the questionnaires. According to the questionnaire, one alleged victim reported that 80 persons died, whereas the same alleged victim told the Group that only one women died. In another case, the Group was informed by an alleged victim that he had been sick for 20 days but in the questionnaire the period of illness was listed as 20 minutes. In a third case, the colour of the substance alleged to have been disseminated was described to the Group as yellow but in the questionnaire it was described as greyish-black, such as that of car fumes. In cases of recent exposure, blood samples had been taken by medical personnel at the camp and sent to Bangkok for analysis and to be available, as well, to any of the embassies there. Many alleged victims claimed to have experienced vomiting and diarrhoea with blood. It was pointed out by the medical personnel that alleged victims crossed the border to Thailand after a certain lapse of time subsequent to the attack and their condition could, therefore, have improved in the intervening period. Therefore, it could not be confirmed on medical grounds as to whether or not these people had been exposed to chemical warfare agents. When the Group visited Khao I Dong hospital to locate medical records of two cases allegedly exposed to chemical attack and said to have been treated there, it met with a doctor who had examined a patient claiming to be a chemical casualty and allegedly suffering from vomiting with blood. After examination by endoscopy, the doctor diagnosed the case as one of gastric stress ulcer.

152. The Kampuchean doctor who worked with the alleged victims inside Kampuchea mentioned that she had not witnessed a chemical attack but that she had attended to alleged chemical casualties suffering from severe chest and abdominal irritation, bloody vomiting, diarrhoea and anuria. These victims had also complained of headache, dizziness and loss of memory. Some patients had recovered rapidly, while others took a long time to recover and remained very weak.

153. One Thai health officer in the village of Ban Sa Tong, which was said to have been affected by a yellow substance, mentioned that he had started receiving patients seven to eight days after the incident and that they had complained of headache, dizziness and diarrhoea. After treatment with tetracycline and sulphaguanidine, they had recovered within a day's time. He mentioned one case of a boy who had dark vomitus, bloody stools and bleeding nose and mouth. The provincial hospital where the patient was sent for treatment diagnosed the case as malaria. The health officer in the village of Ban Sub Tha Mau mentioned that, after a similar incident, people complained of itching of skin. Only one child had been very sick and the health officer was unable to ascertain whether or not the cause was the yellow substance. Table 1 in annex VI shows that respiratory and gastrointestinal problems are very common in Ban Sa Tong. There was a marked increase in the incidence of skin complaints in the months following the incident in that village.

154. At the Group's request, Dr. Renoo Kotrajaras, head of the Thai Institute of Dermatology, examined two Hmong refugees who had a rash that they attributed to exposure to a chemical attack two weeks earlier inside Laos. In her written report, Dr. Kotrajaras stated that clinically both cases were of fungus infection and that the lesions were at least three months old. Her colleague, Dr. Somnuk Vibulsek, from Pramongkutkiao Hospital, Bangkok, was of the same opinion. Laboratory examination confirmed fungus infection. The blood picture did not show any specific abnormality.

(b) Interviews with alleged victims

155. Except for two persons who were allegedly exposed two weeks prior to the interview, all the other alleged victims interviewed claimed to have been exposed to such attacks several weeks prior to the interview.

156. The Group examined the two aforementioned cases and found extensive skin rash on the abdomen, axillae, groins, buttocks and feet. At the request of the Group, they were also examined by the head of the Thai Institute of Dermatology. Clinical examination and laboratory tests revealed that the cases were fungal infection of at least three months duration. The blood picture examination did not show leukopenia. Furthermore, no trichothecenes could be detected in blood samples from the two patients (see para. 183).

157. The Group felt that, in respect to the other cases, although the signs and symptoms as reported to the Group (see table 2 in annex VI) might possibly have been produced by exposure to trichothecenes or incapacitating chemical warfare agents, it was in no position to confirm this medically since there were no remaining signs or symptoms at the time of the interview.

VI. SAMPLES OBTAINED DURING ON-SITE VISITS

158. During the on-site visits to Thailand and Pakistan, a number of physical samples, supposedly related to the alleged use of chemical weapons, were handed over to the Group of Experts. In no case was the Group of Experts able to ascertain positively the reported origin of these samples, or the impartiality of those who submitted them but, on the other hand, on an a priori basis, it did not find itself in a position to doubt the integrity of the persons who provided the samples. During the on-site visits to Thailand, the Group of Experts itself also collected some blood and urine samples from alleged victims of chemical attacks. In these cases, the origin of the samples was incontrovertible.

A. Suggested procedure for the analysis

159. The following standardized procedures for the examination and analysis of samples for the presence of chemical warfare agents or their degradation products were agreed upon by the Group of Experts before the visit to Pakistan:

(a) Each sample should be subjected to a non-destructive microscopic investigation and, when necessary, also to scanning electron microscopy. All pertinent features that might aid in determining the presence or absence of chemical warfare agents should be documented by photographs. When the presence of toxins is suspected, the sample should also be investigated with respect to possible occurrence of toxin-producing organisms. When necessary, a small part of the sample might be used for microbiological culture;

(b) At least two control samples should be prepared. These should be as similar as possible in appearance to the original sample but known to be free of actual or potential chemical warfare agents or compounds that might be used in connection with the dissemination of chemical warfare agents;

(c) In each instance, one of the control samples should be spiked with one or more compounds that are suitable for the purpose of verifying the accuracy of the analysis. If three control samples are prepared, two of them might be spiked;

(d) The original sample and the control samples should be labelled in such a way as to give no indication of the identity of the respective sample. A record of the labelling should be kept by the laboratory responsible for this part of the analysis, and should not be divulged until the whole analysis has been completed;

(e) The sample, if large enough, should be divided into two, three or four parts. If it is considered impossible to divide the samples in an equitable manner (for example, because of uneven distribution of the suspected contamination) the samples are to be extracted, using a solvent or a solvent mixture that would not interfere with the chemical analysis. The extracts should then be divided.

(f) After the samples have been divided into subsamples, they should be labelled in the same way as prior to their division and sent to the Secretariat of the United Nations. The Secretariat should relabel the subsamples, keeping a

record of the relabelling. This record would not be divulged until the analyses had been completed. Thereafter, the Secretariat should forward sets of subsamples, including controls and spiked samples, to the laboratory or laboratories selected by the Group of Experts, together with a request detailing which groups of compounds or individual compounds the samples were to be analysed for;

(g) The analyses should preferably be carried out according to accepted methods that have been reported in the scientific literature. If unpublished methods were used, the report on the results of the analyses should include detailed descriptions of the methods; otherwise, a reference to the relevant scientific paper describing the method would be sufficient;

(h) The analyses should be both of a qualitative and quantitative nature. The identification of the compounds should, if possible, be based upon comparison with authentic reference compounds, not only by chromatographic or similar data, but also by spectroscopic data. The report on the quantitative analyses should include an estimate of the standard deviation. After completion of the analyses, the reports should be sent to the Secretariat;

(i) When it has received all reports on the analysis of a group of samples, the Secretariat should request the laboratory responsible for the preparation of the controls and spiked samples to forward their labelling record directly to the Chairman of the Group of Experts.

B. Description and initial handling of samples

160. The samples obtained in Thailand during the on-site visit in 1981 consisted of (a) leaf pieces, (b) part of a stem, (c) granular matter, (d) blood and serum samples handed over to the Group and (e) blood samples collected by the Group itself. Further details of these samples are included in annex II. After receipt or collection of the samples, they were safeguarded until they could be transferred to the United Nations Headquarters in New York. The process of sample analysis was initiated as soon as the Group had completed its long and careful considerations on a proper procedure and had selected suitable laboratories willing to undertake the analyses.

161. The samples obtained in Pakistan consisted of (a) allegedly toxic wheat grains, (b) part of a parachute, (c) gas mask with filter canister, (d) material described as a fuse from an alleged chemical hand bomb and (e) ammunition consisting of four bullets alleged to be toxic, one so-called "kalakov" bullet and one flechette alleged to be toxic. Further details of these samples are included in annex III. After the samples were received, they were kept under constant surveillance until they could be suitably packed at the United Nations offices at Islamabad and sent, under official United Nations seal, to the United Nations Headquarters in New York.

162. The samples obtained in Thailand during the 1982 visit consisted of (a) pieces of leaves with yellow spots said to originate from Laos, (b) brownish-grey granular matter handed to the Group at Ban Vinai, (c) blood samples collected by the Group

itself, (d) urine samples also collected by the Group itself, (e) leaves with yellow spots, said to originate from Kampuchea, (f) water collected from an area allegedly subjected to a chemical attack and (g) serum samples handed over to the Group. Further details of these samples are included in annex IV. After receipt or collection, the samples were carefully safeguarded until they could be sent in sealed boxes to the United Nations Headquarters in New York and to the National Defence Research Institute, Department 4, at Umeå, Sweden (for further details, see para. 175). At the request of Thai officials, a part of the sample consisting of pieces of leaves with yellow spots was handed over to a representative of the Chemical Department of the Royal Thai Army.

C. Implementation of the analysis procedure

163. At Headquarters, the samples obtained from Thailand in 1981, and those from Pakistan were formally transferred to the United Nations Medical Service and the United Nations Security Service respectively, where they were kept under safe and secure conditions prior to their dispatch to various laboratories for analysis. Every possible precaution was taken to ensure that no tampering could occur (regarding the samples obtained from Thailand in 1982, see paras. 175 and 176).

164. Some initial attempts to find a laboratory that could undertake the preliminary examination of the samples, the division of the samples, the preparation of control samples, and so on, were unsuccessful. Finally, it was decided that this part of the investigation would be carried out at the National Defence Research Institute, Department 4, Umeå, Sweden.

165. The samples were transported in a sealed box from New York to Umeå, Sweden. On 7 April 1982, the box was opened in the presence of the Chairman and the Secretary of the Group of Experts as well as the Consultant.

166. The individual samples were first subjected to an initial examination, the object of which was to disclose any facts that might be of help for the actual chemical analysis. Besides visual inspection, various other methods, for example, toxicological testing, were used. Further details are given in annex II for the samples from Thailand and in annex III for the samples from Pakistan. Thereafter, the samples were divided into subsamples as described in those annexes.

167. Control samples were then prepared. Care was taken that the control samples should be as similar in appearance to the original samples as possible. To some control samples, known quantities of known chemical warfare agents were added ("spiked control samples"). For technical reasons, the laboratory carried out the spiking after the subdivision of the control samples.

168. The original samples from Pakistan and the corresponding control samples and spiked control samples were labelled by Dr. Per-Gunnar Jönsson of the National Defence Research Institute, who also kept a confidential record of the labelling. Similarly, the labelling of the samples from Thailand and the corresponding control samples and spiked control samples was done by Dr. Åke Bovallius, also of the National Defence Research Institute, who kept that labelling record. For practical

reasons, including the difficulties involved in shipment of toxic materials, the subsamples were not sent to the Secretariat, as called for by the suggested procedure. Instead, they were handed over to the Chairman and the Secretary of the Group of Experts, who immediately carried out the prescribed relabelling. Identical records of the relabelling were placed in two envelopes, which were sealed and kept by the Chairman and the Secretary.

169. The relabelled original samples, control samples and spiked control samples were divided into sets and packed in boxes, which were sealed by the Chairman and the Secretary in the presence of the Consultant. In order to avoid any unnecessary shipment of toxic materials, the sealed boxes were kept in a safe at the National Defence Research Institute while awaiting replies from the laboratories that were to undertake the actual analysis.

170. Initial contacts with representatives of laboratories in a neutral country indicated that they were prepared to carry out the analyses following inquiries that were directed to them, which revealed that the matter concerning specific authorization from their authorities had been duly taken into account. After informing those representatives of their place and time of arrival, the Chairman, the Secretary of the Group and the Consultant went to that country with a sealed box containing one set of samples from Pakistan together with the appropriate control samples. Upon arrival, they were met by a representative of one of the laboratories. In accordance with prior arrangements, the representative accepted the box of samples and took it to the laboratory. A few hours later, the Chairman received a message from the head of the laboratory to the effect that official authorization had not been forthcoming and, hence, the laboratory was no longer in a position to carry out the analysis. However, since authorization had been anticipated the box had been opened. The Group, therefore, decided not to use those samples for analysis, with a view to preserving the impartiality of the process.

171. Based on that experience, it was decided that, despite a written statement from a laboratory in another neutral country that no authorization from its Government was required for undertaking the analysis of a second set of samples, it was necessary to contact the head of the Permanent Mission to the United Nations Office at Geneva, of the country concerned, in order to verify that no authorization was required. After a protracted delay, information was given to the effect that an authorization was indeed required and that the Government would not be able to grant it.

172. Faced with this difficult situation, the Chairman, the Secretary of the Group and other officials from the United Nations Centre for Disarmament in New York spent considerable time in contacting various Governments through the respective Missions to the United Nations in Geneva and New York, concerning the possibility of conducting an analysis of the samples in qualified laboratories in those countries.

173. Finally, the following laboratories agreed to conduct the analyses with the consent of their respective Governments:

- (a) Prins Maurits Laboratory (Dr. A.J.J. Ooms), T.N.O., Rijswijk, the Netherlands;
- (b) Civilförsvarets Analytisk-Kjemiske Laboratorium (Dr. A. Kjaer Sørensen), Copenhagen, Denmark;
- (c) Department of Toxicology and Microbial Chemistry (Professor Y. Ueno), Tokyo University of Science, Tokyo, Japan;
- (d) II. Medizinische Universitätsklinik für Klauentiere (Dr. M. Schuh), University of Veterinary Medicine, Vienna, Austria;
- (e) Reactor Laboratory (Dr. R. Rosenberg), Technical Research Centre of Finland, Espoo, Finland;
- (f) Biotechnical Laboratory (Professor T.M. Enari), Technical Research Centre of Finland, Espoo, Finland.

The first two laboratories analysed the samples from Pakistan and the other four analysed those from Thailand.

174. The sealed boxes containing the sets of samples were sent to the respective cities by air freight, under special arrangement. In each case, the Chairman and the Secretary of the Group were met at the airport by representatives of the respective foreign ministries and of the laboratories involved, who assisted with customs procedures, allowing the samples to enter the country without the container being opened. In each instance, the unopened box was then taken to the laboratory and opened there in the presence of the Chairman and the Secretary of the Group.

175. In the case of the samples obtained in Thailand during the on-site visit in 1982, time constraints made it impossible to adhere to the originally adopted procedure - if any analytical results were to be obtained for consideration prior to the submission of the Group's report. Some alternative procedures were suggested and the ramifications thereof were pointed out. The Group then decided that priority should be given to the analysis of the blood samples collected by the Group itself at Ban Vinai, the leaf sample containing yellow spots and the brownish-grey sample of granular matter handed to the Group also at Ban Vinai. These samples were appropriately divided by the Consultant in the presence of the Group, and one part was immediately sent in a sealed box, as air cargo, in accordance with previous arrangements, to the National Defence Research Institute, Department 4, Umeå, Sweden. In the case of the blood and leaf samples, analysis was requested for the presence of trichothecenes. The granular matter was to be subjected first to a toxicological test; the subsequent chemical analyses would depend on the signs and symptoms observed during the toxicological test. Furthermore, at the request of Thai officials, one part of the leaf sample containing yellow spots was handed over to a representative of the Chemical Department of the Royal Thai Army.

176. The remaining parts of the samples to which priority for analysis had been given were sent together with all other samples, in a sealed box, as air cargo under special arrangement, to United Nations Headquarters in New York. The Group considers that the duplicate samples now held at United Nations Headquarters should be retained there to permit further analysis, should this be considered necessary. Once it has become obvious that there is no need for further analysis, these samples will be disposed of. The Group further recommends that the samples that have not so far been dealt with should be analysed in due course.

D. Results of the analyses

1. Samples from Pakistan

177. When the final reports on the analyses had been obtained, the sealed records of the labelling and relabelling were opened during the fifth session of the Group of Experts. The results showed that only in the spiked control samples had any chemical warfare agents been detected. Further details of the results are given in annex III.

178. The detection limits are difficult to estimate since they depend upon the nature of the sample, the chemical warfare agent involved and the method of analysis. The highest detection limits would be expected in the case of samples consisting of activated charcoal, since the desorption of organic compounds from such material is difficult and it is, furthermore, designed for the decomposition of chemical warfare agents into nonvolatile products. One laboratory indicated the detection limit in this case to be 10-20 ppm (parts per million) for arsenic containing agents 100 to 500 ppm for chlorine containing agents. Assuming that all of a chemical agent is retained in the 20 per cent of the charcoal closest to the air inlet, a detection limit of 100 ppm corresponds to a 10-minute exposure to a concentration in the range of 4-15 mg m⁻³.

179. The Group of Experts is well aware of the long time delay between the alleged exposure of the samples to chemical warfare agents and the actual analysis. When the samples were handed over to the Group, weeks or months had already elapsed since the alleged exposure, which made it likely that only persistent chemical compounds would still remain.

2. Samples from Thailand obtained in 1981

180. When the final reports on the analyses had been obtained, the sealed records of the labelling and relabelling were opened during the sixth session of the Group of Experts. Two of the laboratories had not detected any trichothecenes, either in the samples, the control samples or spiked control samples. The third laboratory reported on the presence of trichothecenes in some of the spiked control samples and had also detected low concentrations of such mycotoxins in the corresponding samples, as well as in the corresponding control samples supposed to be free from mycotoxins. The fourth laboratory had found a high concentration of arsenic in the spiked blood sample, but otherwise only normal arsenic levels. Further details of the results are given in annex II.

181. From the negative results of the analyses of spiked control samples reported by two laboratories, it can be concluded that, in those two cases, the detection limits for T-2 toxin and diacetoxyscirpenol exceeded 25 ppm and 100 ppm respectively. In the same way, it can be concluded that the detection limits of the method used by the third laboratory for analyses of blood samples, was higher than 2.7 ppm for diacetoxyscirpenol and 1.4 ppm for T-2 toxin, whereas the method used for the analyses of samples of leaf, stem and granular matters was considerably lower than 43.6 ppm for diacetoxyscirpenol and 4.6 ppm for T-2 toxin.

182. The results of the analyses of the blood samples are inconclusive. No trichothecenes were detected, but the detection limits were too high to allow detection of concentrations in the ppb (parts per billion) range. Also, the analyses of the leaf, stem and granular matter samples yielded inconclusive results, since trichothecenes were found not only in the original samples and spiked control samples but also in the control samples supposed to be free from toxins. The Group was not in a position to determine whether this was due to actual presence of the toxins or to contamination at some stage of the handling of the material or to some other cause.

3. Samples from Thailand obtained in 1982

183. For reasons explained in paragraph 175, only four of the samples were analysed, and by one laboratory only. No trichothecenes were found either in the blood samples or in the sample consisting of pieces of leaves with yellow spots. The sample of brownish-grey granular matter was found to contain carbofuran, and was reported to be probably identical with a commercially available preparation. Further details of the results are given in annex IV.

184. Since the background information given for the sample of brownish-grey granular matter was based on hearsay, and since the Group could not verify the actual origin of this sample, it could not base its final judgement on the result of the analysis.

VII. CONCLUSIONS

185. In pursuance of General Assembly resolution 36/96 C, which requested the Secretary-General to continue his investigation pursuant to Assembly resolution 35/144 C, the Group, inter alia, addressed itself to the submissions at hand and undertook on-site visits to Pakistan and Thailand, in accordance with paragraph 5 (b) of resolution 35/144 C. In the course of those on-site visits, it interviewed alleged victims and eyewitnesses of alleged chemical attacks as well as medical personnel and explored other sources of information as well. During the on-site visits, the Group was handed various samples and also collected specimens of blood and urine from alleged victims.

186. In its evaluation of the written submissions, the Group noted that, while alleged victims and/or eyewitnesses would be in a position to provide firsthand accounts, it could not overlook the fact that such accounts might be incomplete or

distorted for various reasons. The Group therefore found it difficult to make a definitive assessment regarding the veracity of the accounts given by the alleged victims or eyewitnesses mentioned in the submissions.

187. Many of the medical signs and symptoms reported by the alleged victims and medical personnel, referred to in the submissions, could be explained by trichothecene poisoning whether due to natural occurrence or other causes. However, because of the vagueness of the symptomatology presented in most of the reports, explanations other than the use of trichothecenes cannot be excluded. The Group considers that the methods described in the submissions for trichothecene analysis are adequate to ensure correct identification and to give quantitative results with satisfactory precision. As to the analytical results presented in the submissions, the Group concluded that the presence of T-2 and HT-2 toxins in the blood and urine samples would be consistent with previous exposure of the alleged victims to mycotoxins of the trichothecene type but it was unable to decide from the analytical results whether such exposure was due to a chemical attack or could be attributed to natural causes.

188. The Group considers the reported presence of synthetic substances, such as polyethelene glycol and lauryl sulphate, in samples of yellow powder from Laos to be significant. However, with respect to the origin of the samples, the Group felt that while, on an a priori basis, it would not wish to question that the samples were collected in the areas specified in the submissions, it was not in a position to ascertain beyond a reasonable doubt whether or not these samples were obtained from areas that had been exposed to chemical attacks.

189. Because of the prolonged lapse of time between the alleged exposure to chemical attack and the time when it conducted the interviews and medical examinations of the alleged victims during its on-site visits, the Group was not able to detect signs and symptoms pathognomonic of exposure to chemical attack. However, the Group had the opportunity to interview two Hmong refugees who claimed to have been exposed to the yellow powder only two weeks earlier. Medical examination, in consultation with two dermatologists, proved that their skin condition was due to fungus infection of at least three months' duration. Analyses of their blood did not show any trace of trichothecenes (sensitivity of the method is 10-100 ppb) and there was no leucopenia.

190. As reflected in this report, due to circumstances beyond its control, the Group was not in a position to proceed to the territories where chemical attacks had allegedly occurred and it was, therefore, unable to conduct any on-site investigations on those territories. This made it impossible for the Group itself to collect samples, including munitions and/or remnants thereof, in those territories. Nevertheless, the Group received samples allegedly collected in some of the areas of conflict during its visits to Pakistan and Thailand. The Group also collected blood and urine samples from alleged victims during the on-site visits.

191. The results of chemical analyses of samples received or collected by the Group are inconclusive. In most cases, no presence of chemical warfare agents beyond the detection limits of the analytical methods used could be demonstrated. In one

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case, a Hmong refugee handed to the Group a sample of granular matter allegedly used to poison food. Analysis of this material showed that it contained a highly toxic substance, carbofuran, in a concentration of 1-5 per cent mixed in sand. But the unclear origin of the sample and the fact that it is probably identical with a commercially available preparation made it difficult for the Group to draw any conclusions from this finding.

192. While the Group was in Thailand in October 1982, it was informed by the Thai authorities about the appearance of a yellow substance, on 19 February 1982, in two Thai villages and it was invited to visit those two villages. This, of course, could not be considered a timely access to those areas. However, from the interviews and medical records available, it was evident that following exposure to the yellow substance there was a marked increase in the incidence of skin complaints in one of the villages, as reported to the Group.

193. In its evaluation of the allegations mentioned in the course of the interviews, the Group noted that some allegations were only supported by scanty circumstantial evidence and that alternative explanations other than the one of chemical warfare agents were possible and, in most of those cases, even likely. One example is the allegations concerning poisoning of water supplies, which could be explained by natural occurrences of pollutants in the water. In some cases, because of lack of adequate information or evidence of any kind presented, it was not possible to arrive at any conclusion.

194. Other allegations were supported by more circumstantial evidence but alternative interpretations of the causative agent could still be possible. This is exemplified by some of the allegations concerning various forms of coloured smokes in Afghanistan, which probably could be attributed to the use of incendiaries.

195. In some cases, however, more circumstantial evidence was obtained by the Group both from written submissions as well as during its on-site visits. One such well-supported allegation concerned the possible use of harassing agents in the underground water canals (karez) in Afghanistan.

196. Another example is the allegation of the use of some toxic material in the area in Laos where the Hmong people live. The Group was not able to pin-point any specific chemical warfare agent or other toxic compounds as the causative agent. Most of the circumstantial evidence concerning the Hmong allegations is contained in the written submissions. Furthermore, additional circumstantial evidence was obtained by the Group during its visit to Thailand.

197. While the Group could not state that these allegations had been proven, nevertheless it could not disregard the circumstantial evidence suggestive of the possible use of some sort of toxic chemical substance in some instances.

Notes

- 1/ During 1981, the Group held three sessions.
- 2/ League of Nations, Treaty Series, vol. XCIV (1929), No. 2138, p. 65.
- 3/ For a description, see, for example, K. Wolski: "Les Kares: installations d'irrigation de terrains semi-désertiques, Afghanistan-Béloutchistan", Folia Orientalia vol. 6 (1965), pp. 179-204.

ANNEX I

Communications sent on behalf of the Group of Experts

A. Correspondence with Democratic Kampuchea

1. Letter dated 27 August 1982 and attached questionnaire sent on behalf of the Group of Experts to the Permanent Representative of Democratic Kampuchea to the United Nations

I have the honour to refer to your letter dated 15 June 1982. This letter was duly transmitted to the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons established by the Secretary-General in pursuance of General Assembly resolution 35/144 C, which continues to assist the Secretary-General in pursuance of General Assembly resolution 36/96 C.

On behalf of the Group of Experts I would like to convey their appreciation for your Government's invitation to visit Democratic Kampuchea during the next dry season, beginning in October 1982, to carry out its inquiries on the spot.

The Group of Experts would be pleased to accept your Government's invitation and, in that connection, and furthermore with a view to ensuring the feasibility of such a visit, would appreciate specific information concerning the following:

1. Safe and secure routes of access to Democratic Kampuchea and to the areas to be visited and the means of transportation to and from the points of access.
2. Specific areas to be visited.
3. The exact military and other conditions that currently prevail in the areas to be visited.
4. Is there guerrilla warfare in those areas?
5. Are there mine fields in the jungle or other areas to be visited?
6. Are there terrorists in these areas that would be a security risk for the visiting group?
7. Is kidnapping of mission personnel or hostage situations a possibility?
8. Will military or police provide personnel and group security?
9. Will the authorities concerned provide transportation?
10. Will there be adequate communication systems for operation within the country and to establish outside connexions?
11. Are there adequate medical facilities in areas to be visited?
12. Will a doctor be provided during the mission?

13. Are there any other situations or conditions, in particular with respect to any security and/or logistical aspects, that exist that are not covered in the above questions of which the visiting Group should be aware?

Furthermore, with a view to also ensuring a meaningful outcome of such a visit, the Group of Experts would appreciate answers to the questions contained in the annexed questionnaire related to the following alleged attacks referred to in the letters from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General, dated 20 January, 19 March and 19 April 1982:

<u>Place</u>	<u>Date</u>
Thmar Baing district	22 November 1981
Western Beach region	25 January-13 February 1982
Pailin district	26-28 February 1982
Pailin district	Early March 1982
Pailin district	26 March 1982

The letter dated 19 April 1982 stated that on 2 April 1982 in the Pailin district "eleven gas masks used by Vietnamese soldiers" were seized. When gas masks, in actual use, are exposed to chemical warfare agents, such agents might be retained for a long time in the filter canisters of the masks. Could some or all of the complete gas masks be made available to the Group of Experts, during this visit, for chemical analyses? If so, it would also be desirable to have any available information on whether those gas masks had been used prior to the seizure as well as information on how they were handled during the period between their seizure and their submission to the Group of Experts.

Finally, the Group of Experts wishes to point out that timely access to the areas of alleged chemical attack is of crucial importance in enabling the Group to obtain fresh samples and to examine the effects on people, animals and vegetation while signs and symptoms are still evident. Accordingly, the Group of Experts would appreciate any information concerning such incidents, as soon as possible after their occurrence, with a view to reaching such areas at the earliest opportunity.

Questionnaire

1. Could further details be given of the alleged attack with respect to exact time of day, date and place?
2. Are there any victims of or witnesses to the alleged attack who could be made available to the Group of Experts for questioning? If so, please give further details.
3. (a) Can the details of the alleged attack be specified with respect to means of delivery of the chemical agents?

(b) Were any observations made on the features of the attack, e.g., with respect to weather conditions, appearance of the "chemical cloud", effects on animals and plants, etc.?

- (c) Were any samples taken after the attacks? If so, could the samples be made available to the Group of Experts for analysis, or could a report on the analysis of the samples be provided?
4. (a) What symptoms did the surviving victims report? In which sequence did they occur?
- (b) How many were affected and still survived?
- (c) How and for how long were they exposed?
- (d) Was any medical treatment given? If so, where and how soon after the exposure? What was the nature of the treatment? Would it be possible for the Group of Experts to meet with any medical personnel, especially doctors, who attended the victims?
- (e) Are any medical records on victims of the alleged attack available?
5. (a) How many fatalities occurred during and after the alleged chemical attack?
- (b) What period of time elapsed between the attack and the death of the victims?
- (c) Was any medical treatment given before death?
- (d) What was the actual cause of death? Was any post-mortem performed? If so, give details.
- (e) Was there any correlation between the age, sex and general health of the victims and the fatal outcome of the attack?
6. Was there any indication that the alleged chemical warfare agents remained in the area of attack for a prolonged period (days or weeks)? Were any new casualties incurred during this period? If so, please give details.
7. Were any of the persons taking part in the alleged attack taken as prisoners? If so, are they available for questioning by the Group of Experts and are they prepared to give testimony?

2. Letter dated 9 November 1982 from the Permanent Representative of Democratic Kampuchea to the United Nations addressed to the Secretary-General

Further to the letters of 27 August 1982 and 3 November 1982 from the Centre for Disarmament, and on the instruction of my Government, I have the honour to inform you that all the necessary arrangements will be made to ensure the security and transport and meet the medical and logistical requirements of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons in the areas under the control of the Government of Democratic Kampuchea. All necessary arrangements will likewise be made to prevent any kidnapping attempt, terrorist action or explosion of mines.

In addition, the replies to the questionnaire annexed to the above-mentioned letter of 27 August 1982 were transmitted directly to the Group of Experts on 30 October 1982.

B. Letter and attached questionnaire sent on behalf of the Group of Experts to the Government of the United States of America in connexion with its submission dated 22 March 1982

I have the honour to inform you that the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons considers it necessary to seek clarification and further information, as set out below, concerning some of the points contained in the report annexed to your letter to the United Nations dated 22 March 1982 (A/37/157):

1. In several cases there are references to statements by unnamed persons, e.g.:
 - "a former Lao Army captain" (p. 10)
 - "a Lao pilot who flew chemical warfare missions" (pp. 10, 18, 19)
 - "a Vietnamese Army private, who later defected" (p. 11)
 - "a H'Mong resistance leader" (pp. 11, 13)
 - "a former Afghan MI-8 helicopter pilot" (p. 16)
 - "an Afghan pathologist who later defected" (p. 17)
 - "a member of the resistance" (p. 16)

Are the present whereabouts of these persons known? If so, could they be made available to the Group of Experts for questioning?

2. Are any further details known about the cylinders (1.5 meters long and 60 centimeters in diameter), mentioned on page 16? Were the cylinders said to have been attached to parachutes?

3. It is stated in the report (e.g. page 30) that there are no reports concerning the effects of inhalation of trichothecenes, although the footnote to Table C-1 refers to the toxicity of trichothecenes "directly ingested or inhaled". Have any data on inhalation toxicity and effects of trichothecenes become available after the submission of the report? If so, the Group of Experts would appreciate receiving any available data, both concerning pure compounds and mixtures of compounds.

4. In Tables 1-3 a number of alleged attacks are referred to which occurred after the transmittal of the initial submission of the United States of America in reply to the note-verbale of the Secretary-General dated 26 January 1981. For each of these alleged chemical attacks, as well as for any earlier attacks included in Tables 1-3, but not in the previous submissions of the United States of America, the Group of Experts would appreciate answers to the questions in the annexed questionnaire.

I should be most grateful if the clarifications and additional information sought by the Group of Experts could be conveyed to the Secretariat at an early opportunity.

Questionnaire

1. Could details be given of the alleged attack with respect to exact time of day, date and place?
2. Are there any victims of or witnesses to the alleged attack who could be made available to the Group of Experts for questioning? If so, please give further details.
3.
 - (a) Can the details of the alleged attack be specified with respect to means of delivery of the chemical agents?
 - (b) Were any observations made on the features of the attack, e.g., with respect to weather conditions, appearance of the "chemical cloud", effects on animals and plants, etc.
4.
 - (a) What symptoms did the surviving victims report? In which sequence did they occur?
 - (b) How many were affected and still survived?
 - (c) How and for how long were they exposed?
 - (d) Was any medical treatment given? If so, where and how soon after the exposure? What was the nature of the treatment?
 - (e) Are any medical records on victims of the alleged attack available?
5.
 - (a) How many fatalities occurred during and after the alleged chemical attack?
 - (b) What period of time elapsed between the attack and the death of the victim?
 - (c) Was any medical treatment given before death?
 - (d) What was the actual cause of death? Was any post-mortem performed? If so, give details.
 - (e) Was there any correlation between the age, sex and general health of the victims and the fatal outcome of the attack?
6. Was there any indication that the alleged chemical warfare agents remained in the area of attack for a prolonged period (days or weeks)? Were any new casualties incurred during this period? If so, please give details.

ANNEX II

Samples obtained by the Group of Experts during
its visit to Thailand in 1981

During the on-site visit to Thailand in 1981, a number of physical samples, supposedly related to the alleged use of chemical weapons, were obtained by the Group of Experts. The background information provided for these samples is contained in this annex. Furthermore, the annex sets out the actual procedure for the initial examination and division of samples and also for the preparation of control samples. Finally, the results of the chemical analyses, summarized in the text, are given in tables 1 and 2.

1. Leaf Sample

Origin. This sample was turned over to the Group by Dr. Amos Townsend, who provided the following background information: The sample was said to have been collected by a Hmong refugee from an area of alleged attack on 3 October 1981. The sample had been delivered to Dr. Townsend with an anonymous note.

Procedure. The leaf sample did not contain any intact leaves, but consisted of 0.202 g of dark green leaf pieces. The initial examination revealed several spots of various colours (brown, yellow and white) on the pieces. One yellow spot was found to contain granules that appeared very similar to pollen grains. An element spectrum of one brown spot demonstrated the presence of potassium, calcium, chlorine, sulphur, copper and zinc as well as some sodium and magnesium. All these elements are normally found in soil. A small piece of the leaf sample was removed for determination of fungal growth characteristics on maltose-agar plates. No fungal growth was observed.

The sample was crushed into small pieces and divided into three equal parts. To prepare control samples, dried leaves of unknown origin were crushed into small pieces and divided into nine parts. A broth supernatant from a Fusarium sp. and T-2 toxin to a final concentration of 25 ppm were added to three of these and T-2 toxin (10.6 ppm) and diacetoxyscirpenol (DAS) (100 ppm) were added to three of the others.

Results. One laboratory analysed for the presence of T-2 toxin, DAS and HT-2 toxin but did not find these toxins either in the original samples, control samples or spiked control samples. A second laboratory analysed for the presence of T-2 toxin, DAS and deoxynivalenol (DON) but none of these compounds were detected. The third laboratory, analysing for T-2 toxin, DAS, DON and nivalenol, found nivalenol (3-8.5 ppm) in all four samples (the original leaf sample, control sample and two spiked control samples). It also found T-2 toxin (7.9 ppm) and (DAS 23 ppm) in the control sample supposedly free from toxins, as well as T-2 toxin (54 ppm) and DAS (13 ppm) in one spiked control sample and T-2 toxin (32 ppm) and DAS (74 ppm) in the other spiked control sample.

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2. Stem sample

Origin. The origin and the background information provided is the same as for the leaf sample.

Procedure. The stem was subjected to an initial examination, which included scanning electron microscopy. It appeared to be a dried piece of leaf, containing high amounts of helical-shaped material. The underside of the stem was covered with starry hairs that are known to occur on the underside of leaves of certain plants.

A small piece was removed for determination of fungal growth characteristics on maltose-agar plates. A mould, identified as Aspergillus clavatus, was detected. The stem sample (0.007 g) was crushed into small pieces but was too small to be divided.

Three control samples were prepared from red currant stems. T-2 toxin to a final concentration of 4.6 ppm was added to one of the control samples and a T-2 toxin containing broth supernatant from a Fusarium sp. (6.9 ppm) was added to another.

Results. One laboratory analysed these samples for the presence of T-2 toxin, DAS, DON and nivalenol. It found nivalenol (14, 46 and 64 ppm respectively) in the control sample and spiked control samples, T-2 toxin in the spiked control samples (20 and 44 ppm respectively) and DAS in one spiked control sample (31 ppm) and in the original stem sample (26 ppm).

3. Granular matter

Origin. This sample was given to the Group by Lor Nao Pao, a 33 year-old man from Pu Hea, at the Ban Vinai Refugee Holding Center. He stated that he himself had collected the sample from a rock in a rice field, while fleeing from Laos (see interview 14 in A/37/613, annex V).

Procedure. In the initial examination, the greater part of the sample gave the impression of dry yellow soil containing decayed organic matter. The sample consisted of irregular pieces of 1-5 mm size, some round yellow modules and a fine yellow powder. Element spectra performed on three of the irregular pieces showed the presence of potassium, calcium, copper, zinc and iron. One piece also contained titanium and another piece phosphorous and sulfur as well as small amounts of titanium. In scanning electron microscopy, the yellow modules exhibited pollen-like structures, some of them similar in appearance to the granules observed on the leaf sample. The fine yellow powder contained crystals, some of which resembled sodium chloride crystals.

The granular (0.544 g) matter was divided into three equal parts. Control samples were prepared from pieces of the lichen Xanthoria parietina, which were crushed and mixed with yellow terracotta clay and then allowed to dry. After crushing and adding pollen grains from Pinus contorta, the mixture was divided into nine control samples. T-2 toxin and DAS to a final concentration of 25.5 ppm and

43.6 ppm respectively were added to three of the control samples and a broth supernatant from a Fusarium sp. with T-2 toxin (final concentration 17 ppm) was added to another three.

Results. One laboratory, analysing for T-2 toxin, DAS and HT-2 toxin, did not report finding any of these compounds. A second laboratory, which analysed for the presence of T-2 toxin, DAS and DON, did not detect these toxins either in the original sample, control sample or spiked control samples. A third laboratory, analysing for T-2 toxin, DAS, DON and nivalenol, found small quantities of nivalenol (0.2-3.2 ppm) in all samples, including the unspiked control sample. Also, DAS (91 ppm and 1.8 ppm respectively) and T-2 toxin (74 ppm and 25 ppm respectively) were found in the spiked control samples and DAS (0.2 ppm) and T-2 toxin (0.4 ppm) were detected in the unspiked control sample.

4. Blood and serum samples

Origin. Blood samples, assigned numbers 1 to 6, were collected by the Group of Experts itself from six alleged victims who had supposedly been exposed to "yellow powder" 23 days earlier. Details concerning these alleged victims are contained in annex V (alleged victims numbers 8 to 13) of the report of the Secretary-General (A/36/613). Serum sample number 7 and blood samples numbers 8 and 9 were handed over to the Group by Dr. Amos Townsend.

Procedure. Blood samples numbers 1 to 6 were each divided into three equal parts. Serum sample number 7 was judged to be too small for division. Blood samples numbers 8 and 9 were each divided into two equal parts. Control samples and spiked control samples were prepared from human blood. Immediately after the blood had been drawn, it was shaken in glass tubes containing glass beads in order to avoid clotting. Three spiked control samples containing 1.4 ppm T-2 toxin, three spiked control samples containing 0.9 ppm T-2 toxin + 1.1 ppm diacetoxyscirpenol (DAS) and three spiked control samples 2.7 ppm DAS were prepared 3.6 ppm arsenic (as a soluble salt) was also added to one of the spiked samples containing 2.7 ppm DAS.

Results. The results are presented in table 2. Two of the three laboratories that analysed the samples, control samples and spiked control samples for the presence of trichothecenes did not find any trichothecenes, including in the spiked control samples. The third laboratory suspected the presence of HT-2 toxin in blood sample number 4, but could not confirm the result. Also, this laboratory did not find any trichothecenes in the spiked control samples. One laboratory carried out analyses for the presence of arsenic. It reported arsenic levels in the range 0.0067-0.015 ppm in all samples analysed, except in the spiked control sample which was found to contain 3.4±0.2 ppm arsenic.

Table 1. Results of the analysis of leaf samples, stem samples and granular matter

The results from the laboratories that did not find trichothecenes in any of the samples are not included in the table. Concentrations are expressed in ppm (parts per million); DAS = diacetoxyscirpenol, DON = deoxynivalenol (vomitoxin)

Sample	T-2 Toxin		DAS		DON		Nivalenol	
	Added	Found	Added	Found	Added	Found	Added	Found
Leaf sample		b/		b/		b/		6.0
Control sample		7.9		23		b/		3.0
Spiked control sample	10.6	32	100	74		b/		8.5
Spiked control sample	25	54		13		b/		7.8
Stem sample				26				
Control sample		b/		b/				14
Spiked sample	6.9	44		b/				46
Spiked sample	4.6	20		31				64
Granular matter		b/		b/		b/		3.2
Control sample		0.4		0.2		b/		0.2
Spiked control sample	25.5	74	43.6	91		b/		1.4
Spiked control sample	17	25		1.8		b/		0.4

a/ Actual concentration in ppm of the toxin added during the spiking procedure.

b/ Presence was suspected but could not be confirmed. Not all of the ions monitored by selected ion-monitoring mass spectrometry showed peaks at the respective retention times.

Table 2. Results of analyses of blood and serum samples for presence of trichothecenes and arsenic

The results from the laboratories that did not find trichothecenes in any samples are not included in the table. Concentrations are expressed in ppm (parts per million); DAS = diacetoxyscirpenol.

	<u>Trichothecenes</u>		<u>Arsenic</u>	
	Added <u>a/</u>	Found	Added <u>a/</u>	Found
Blood samples collected by the Group				
1		<u>b/</u>		0.0067
2		<u>b/</u>		0.0074
3		<u>b/</u>		<u>d/</u>
4		<u>b/</u> <u>c/</u>		0.0126
5		<u>b/</u>		0.0084
6		<u>d/</u>		0.0072
Blood samples handed over to the Group				
8		<u>b/</u>		
9		<u>b/</u>		<u>d/</u>
Serum sample handed over to the Group				
7		<u>b/</u>		
Control sample		<u>b/</u>		0.015
Spiked control sample	1.4 T-2	<u>b/</u>		0.010
Spiked control sample	2.7 DAS	<u>d/</u>	3.6	3.4
Spiked control sample	0.9 T-2+1.1 DAS	<u>b/</u>		<u>d/</u>

a/ Actual concentrations in ppm of compounds added during the spiking procedure.

b/ A peak with the same retention time as the trimethylsilyl derivatives of nivalenol and T-2 tetraol was observed. However, when one of the samples was subjected to gas chromatography, before treatment with the trimethyl-silylating reagent, this peak was also observed. Therefore, it is highly possible that this peak is not due to trichothecenes.

c/ Presence of HT-2 toxin in the sample was suspected but could not be confirmed.

d/ Sample destroyed during transport.

ANNEX III

Samples obtained by the Group of Experts
during its visit to Pakistan

During the on-site visit to Pakistan, a number of physical samples, supposedly related to the alleged use of chemical weapons, were handed over to the Group of Experts. The background information provided for these samples is contained in this annex. Furthermore, the annex sets out the actual procedures for the initial examination and division of samples and also for the preparation of control samples. Finally, the results of the chemical analyses, summarized in the text, are given in table 1.

1. Allegedly toxic wheat grains

Origin. The sample was handed to the Group by the Islamic Alliance for Liberation of Afghanistan. It was said to have been collected by Khusal Khan, age 33, who came from Qalai Yuruf, Logan Province. The following background information was provided:

During the attack in May 1981, in an area 15 kilometres from Kabul, bombs were dropped that evolved smoke, rendering two persons unconscious. Wheat was harvested from that area by the end of the summer. When people ate bread made from this crop, they felt abnormally hilarious or became unconscious. Animals were observed refusing to eat the wheat grains. Originally, the grains had some peculiar smell, which was not described in detail. The sample was said to originate from this crop.

Procedure. The sample was divided into four parts. One part was used for feeding experiments. A small quantity of that sample was cooled with liquid nitrogen, ground and suspended in distilled water. A male mouse (B57BL) was force-fed by tube with 0.5 ml of the suspension. The mouse died almost immediately. Post-mortem examination showed that the death was due to mechanical damages to the esophagus caused by the tube. Two male mice (C57BL) were then offered intact grains as the only food (and water ad libitum). They consumed the grains with relish during 24 hours and did not show any signs of illness. Finally, two male rats (Wistar, R-type) consumed 5 g of grains during one night without showing any abnormal signs. Three weeks later the animals (as well as the appropriate controls) were sacrificed. A macroscopic post-mortem did not reveal any abnormal findings.

Six control samples of wheat grains were prepared. Three of these were spiked with ortho-chlorobenzylidenemalononitrile (CS) (1.6 mg per sample).

Results. The laboratories reported the presence of CS in the spiked control samples, but found no chemical warfare agents in the original samples of the control samples.

2. Part of a parachute

Origin. This sample was provided by the Afghan leader, Maulvi M. Younus Khalis. The following background information was given:

Early in February 1982, in a village close to Kandahar, something that looked like a tent was dropped from a helicopter. When it hit the ground, "fumes" of different kinds evolved. A part of this "tent" (that is, a parachute) was brought to Peshawar. The sample is said to be a small part of this parachute.

Procedure. As a preliminary test, a 1 cm² piece of the sample was applied by means of adhesive tape to the skin on the inner aspect of the left arm of a volunteer from the group. The arm was examined after 24 hours. No reaction was observed.

The original sample was cut into small pieces and divided into three parts. Six control samples were prepared from used and artificially soiled parachute fabric. Three of these were spiked with 2,2'-dichlorodiethylsulfide (mustard gas, HD) and CS (1.6 mg of each per sample).

Results. Both laboratories found HD and CS in the spiked control samples. No chemical warfare agents were found in the original samples or in the unspiked control samples.

3. Gas mask with filter canister

Origin. The mask was provided by the Afghan leader, Maulvi M. Younus Khalis, together with the following background information:

The mask was said to have been taken in September 1981 near Orgun, Pakhtiar Province, from a dead Afghan soldier. It was not known whether the mask had been used in any alleged chemical attacks before it was captured. It was not in actual use when being taken and it had not been used since.

Procedure. The gas mask filter canister was cut open and the aerosol and carbon filters were separated.

The aerosol filter was slightly greyish, indicating that it might have been used. It was cut into small pieces and the pieces divided into three parts. Six control samples were prepared, three of them spiked with each 1.6 mg HD and 1.6 mg CS.

The part of the carbon filter being closest to the air inlet was divided into three parts. Six control samples were prepared from Cr-Cu-Ag-impregnated activated charcoal with a particle size similar to that of the original sample. Three of the control samples were spiked with HD and CS (1.6 mg of each agent per sample).

Results. In the case of the aerosol filter samples, the laboratories detected the presence of HD and CS in the spiked control samples. In the original samples and unspiked control samples, no chemical warfare agents were found.

In the case of the carbon samples, one laboratory found only HD in the spiked control sample. The other laboratory reported the presence of both HD and CS. Otherwise, no chemical warfar agents were found.

4. Material described as a fuse from an alleged chemical hand bomb

Origin. It was handed over to the Group by the Islamic Alliance for the Liberation of Afghanistan. The actual origin of the sample is unknown. It was stated that when it is to be used, the head portion of the chemical hand bomb is lighted. The bomb is dropped and, when the part containing the chemicals warms up, it activates the chemicals, which then poison the atmosphere.

Procedure. The "fuse" was cut into small pieces and the pieces divided into four parts. One part was submitted to ignition tests. The burning behaviour was not that of a fuse. There was no indication that toxic compounds were released upon burning.

Six control samples were prepared from partly-burned cotton threads. Three of them were spiked in the usual way: 1.6 mg HD and 1.6 mg CS per sample.

Results. Both laboratories found CS and HD in the spiked control samples but no chemical warfare agents either in the untreated control samples or in the original samples.

5. Various bullets and a flechette

Origin. The following ammunitions were handed over to the Group by Ustaf Sayyaf of the Islamic Alliance for the Liberation of Afghanistan:

(a) Four allegedly toxic bullets of unknown origin. It was stated that if a person was wounded by such a bullet general intoxication would result and the wound would heal very slowly;

(b) One bullet of unknown origin described in writing as "kalakov" ammunition and similarly as a "dam dam" bullet, allegedly involved in a chemical attack;

(c) One flechette of unknown origin, alleged to be toxic, of which no further details were given.

Procedure. The tips of the samples were filed off and the metal filings were combined into one sample. A control sample, consisting of pure lead filings, was prepared. Because of the nature of the sample, no spiking was considered necessary.

Results. Only one laboratory analysed the sample and the control sample. No chemical warfare agents were detected.

Table 1. Results of the analyses of the samples from Pakistan

CS = ortho-chlorobenzylidenemalononitrile
 ED = 2,2'-dichlorodiethylsulfide (mustard gas)
 TD = 2,2'-dihydroxydiethylsulfide (decomposition product of HD)
 CB = ortho-chlorobenzaldehyde (decomposition product of CS)

<u>Sample</u>	<u>Laboratory A</u>	<u>Laboratory B</u>
Allegedly toxic wheat grains	-	-
Control sample	-	-
Spiked <u>a/</u> control sample	CS	3-5 ppm CS + CB
Part of a parachute	-	large quantities of hydrocarbons
Control sample	-	-
Spiked <u>b/</u> control sample	CS, HD	40-70 ppm CS+CB, 60-75 ppm HD, trace TD
Charcoal from gas mask filter	-	-
Control sample	-	-
Spiked <u>b/</u> control sample	CS, HD	2 ppm CB, 75 ppm ED, trace TD
Aerosol filter from gas mask filter	-	large quantities of hydrocarbons
Control sample	-	-
Spiked <u>b/</u> control sample	CS, HD	150-350 ppm CS+CB, 45 ppm HD, trace TD
Fuse	-	large quantities of hydrocarbons, H ₃ PO ₄
Control sample	-	-
Spiked <u>b/</u> control sample	CS, HD	230-530 ppm CS-CB, 270-330 ppm HD
Ammunition filings	<u>c/</u>	metal mixture, mainly lead, iron, copper, trace of ethyl centralite
Control sample	<u>c/</u>	lead

- a/ Spiked with 1.6 mg of CS.
b/ Spiked with 1.6 mg of CS and 1.6 mg of HD.
c/ Sample not sent to this laboratory.

ANNEX IV

Samples obtained by the Group of Experts during
its visit to Thailand in 1982

During the on-site visit to Thailand in 1982, a number of physical samples, supposedly related to the alleged use of chemical warfare agents, were obtained by the Group of Experts. The background information provided for these samples is contained in this annex. Furthermore, the annex sets out the procedure for the division of the samples and summarizes the results of the chemical analyses.

1. Pieces of leaves with yellow spots said to originate from Laos

Origin. The sample was handed over to the Group by Ying Yang (see annex VI) who stated that it had been collected in the village of Nam Sam in Laos on 18 October 1982 after an alleged chemical attack.

Procedure. The sample consisted of a densely packed mass of leaves and parts of leaves. This mass was moist and some of the leaves had putrified to a certain extent. The individual parts of the sample were carefully separated and those areas where yellow spots appeared were cut out and divided into three subsamples.

Results. One of the subsamples was analysed for the presence of trichothecenes but no such toxins were detected.

2. Brownish-grey granular matter

Origin. This sample was handed over to the Group by Song Leng Xiong, an earlier member of General Van Pao's army, along with the following background information:

The sample was said to have come from a bottle that was given "by government officials" to some people in Nam Put village together with a syringe. The sample had been obtained from a man said to be still residing in Laos, who had allegedly claimed that instructions were given by the "government officials" to dissolve the content of the bottle in water. The solution should then be injected into or poured over rice, corn, vegetables, and so on, in order to make them toxic. It was further claimed that the same material could be used in 105 mm artillery shells or be disseminated from aircraft.

Procedure. The sample consisted of some brownish-grey granular matter with a sticky appearance, the size of the granules being 1-2 mm. The sample was divided into two parts.

Results. The sample was found to contain sand, a violet inorganic pigment and 2,3-dihydro-2, 2-dimethyl-7-benzofuranol methylcarbamate (carbofuran, CAS registry

no. 1563-66-2). The concentration of the carbamate in the sample was estimated to be 1-5 per cent. According to the laboratory that analysed the sample, it is probably identical with a commercially available preparation of the carbamate, containing 5 per cent of the carbamate with sand as a carrier. This preparation is used as a systemic insecticide, an acaricide and a nematocide. The carbamate is highly toxic to mammals (LD₅₀ in mouse, p.o., 2 mg.kg⁻¹ body weight).

3. Blood samples

Origin. At Ban Vinai, the Group itself, on 2 November 1982, collected blood samples from two of the refugees, Ying Yang and Vang Chue Kee, who had allegedly been exposed to a chemical attack on 18 October 1982 (for further details, see annex VI). The Group also collected control blood samples from a Hmong refugee who reportedly had not been subjected to any alleged chemical attack.

At Udon, the Group itself, on 3 November 1982, also collected blood samples from a refugee, Kai Lor, who claimed to have been exposed to a chemical attack. It was not possible to ascertain the exact date of that alleged attack but it was suggested that it could have taken place in July or August 1982 (for further details, see annex VI).

Procedure. The blood samples obtained at Ban Vinai were each divided into two parts, one of which was sent for immediate analysis for the presence of trichothecenes. The remaining parts of these samples as well as the control blood samples obtained at Ban Vinai and the blood samples obtained at Udon being kept at United Nations Headquarters in case any further analyses would be required.

Results. No trichothecenes could be detected in the blood samples obtained at Ban Vinai. The detection limit was said to be in the range of 10-100 ppb.

4. Urine samples

Origin. Along with the blood samples, urine samples were collected at Ban Vinai from Ying Yang and Vang Chue Kee and at Udon from Kai Lor.

Procedure. The urine samples were not divided but sent to United Nations Headquarters in order to be available for chemical analysis, if so required.

5. Leaves with yellow spots said to originate from Kampuchea

Origin. The sample was handed over to the Group by Rev. Fr. Bunlert Tharachatr and Dr. Jidbhong Jayavasu of the Catholic Office for Emergency Relief and Refugees. It was said to have been collected in Sor Sann village in Kampuchea, on 30 October 1982, shortly after an alleged chemical attack.

Procedure. The intact sample was sent to United Nations Headquarters.

6. Water sample

Origin. The origin and the background information provided is the same as for the previous sample, except for the exact date of collection, which was not specified.

Procedure. The intact sample was sent to United Nations Headquarters.

7. Serum samples

Origin. The samples were handed over to the Group by the same persons who provided samples 5 and 6. The following background information was given:

Two serum samples from patients named Po Sok Taa and Yen were collected on 5 November 1982. These two patients had a history of exposure to a yellow chemical spilled from artillery on 3 November, and developed diarrhea and hematemesis afterward. No detailed physical examination was recorded.

Specimen from Ma Yong, male, age 35, was collected on 11 November. He contacted the "yellow rain" on 6 November in the village. Soon after exposure, he had a headache and loss of appetite; he experienced sleepiness, palpitation, nausea and vomiting. He also had a feeling of swelling of the face, illusion and dizziness. On physical examination, he had good consciousness, was afebrile and had no abnormal physical signs.

Serum specimen from Sokh, female, age 50, was collected on 11 November. She contacted "white rain" on 9 November. Soon after exposure, she developed tiredness, blurred vision, vertigo and palpitation. She had diarrhea for two days, without blood or mucus, and some abdominal and chest pain. On physical examination, she had good consciousness, vague tenderness at epigastrium, with no other abnormal finding.

ANNEX V

Summary of statements made during interviews conducted by the
Group of experts during its visit to Pakistan

Medical personnel

1. Dr. Alif Khan, medical officer, Hizbi Islami Hospital, Peshawar:

He had been working at the hospital for one and a half years since he crossed over from Afghanistan. He witnessed an attack in February 1980 at Spinlar (white) mountain area by MIG fighters and helicopters. Two days later, two men, three women and five children were found dead in a cave. Their bodies were swollen but without any visible external injuries on them. He heard that many goats had also died.

He also reported that, sometime in 1979, some Afghans were invited to a party after which they became sick with nausea, vomiting and diarrhea. Food poisoning was suspected. In March 1980, about 60 Mujahideen were invited to a dinner after which all got food poisoning; two died, the rest recovered.

He had seen about 250 patients suffering from neurosis following gas attacks.

2. Dr. Mohammed Shairf, medical officer, Hizbi Islami Hospital, Peshawar:

He came to Pakistan in April 1981 and had been working at the hospital for three months. He witnessed an attack at Kasimpul, near Kantahal, five days before he came to Pakistan in April 1981. There was a bomb blast in which a man and his son were injured. The son was burned beyond recognition whereas the father sustained a big wound on his thigh, which was bleeding profusely. He attended to the above victims.

While he was a student, he had come across a man who had been flushed out by gas from his hiding place in a karez. The latter became ill and depressed and was subsequently taken to the hospital.

Dr. Sharif also mentioned another attack that took place in February 1981 when something resembling a balloon, 700 mm in diameter, was dropped from either a helicopter or MIG and burst before reaching the ground, scattering yellow and pink powder. Those affected complained of rash over their bodies, difficulty in breathing, watery eyes and sneezing. Their skin was itchy and brown over the exposed parts. They also experienced severe vomiting and mild diarrhea. The doctor treated them with hydrocortisone. Out of the 35 people affected, 17 die, 4 on the spot.

3. Noor Mohammed, male nurse, Hizbi Islami Hospital, Peshawar:

He came to Pakistan five months prior to the interview. He had treated patients two hours after an attack at Worban Parwan in June 1981. They were complaining of dyspnea, vomiting and dizziness, and he administered glucose and coramine while on the battlefield. He noticed that one of the victims had spots on his body; others had runny nose, tearing and blisters on the exposed parts of the skin within seven hours.

Since the incident took place far from the village, no persons but only the vegetation in the area was affected.

4. Dr. Abdul Ghuffar, medical officer, Hizbi Islami Hospital, Peshawar:

On 4 January 1982 he treated a patient who claimed that his left hand had been hurt when a bomb exploded. He developed skin irritation, the skin turned blue and then a wound developed. The doctor bandaged it and sent him away but, when he returned after 15 days, the wound was worse. He referred him to a government hospital and a diagnosis of squamous cell carcinoma was made after histopathology.

5. Shajehan, male nurse, Hizbi Islami Hospital, Peshawar:

In October 1981 he personally witnessed an attack but he was not affected. A helicopter dropped bombs, some of which burst in the air before reaching the ground, evolving red and green colours. People close by became unconscious for a period ranging from 4 to 24 hours. They also sustained burns. He treated them with intravenous transfusion. Plants, leaves and grass became dry and discoloured.

Alleged victims

1. Dagarwal Bismilla

Residence: Wardak

Occupation: Chief commander

Place of exposure: Wardak front

Date of exposure: Late July 1981

Mode of delivery: Shelling.

Effects: Sneezing and coughing, headaches and unconsciousness, tears, vomiting and diarrhea.

2. Abdulla; male; married; age 35

Residence: Wardak

Occupation: Mujahid (major)

Place of exposure: Herat, three years ago; Paghmar

Date of exposure: 1981

Mode of delivery: Shelling occurred before sunrise and black smoke evolved followed by yellow smoke.

Effects: Dizziness, headache and tightness in the throat; eyes congested and watery.

Physical examination: Nothing abnormal detected.

Further information: As part of the treatment, he was given saline and glucose.

3. Fazlullah; male; single; age 22

Residence: Village Razana, Magool Ghazni

Occupation: Student

Place of exposure: Razana, Magool, Ghazni

Date of exposure: December 1981, 1 p.m.

Mode of delivery: Aerial attack with bombs.

Effects: Eyes started watering; irritability and loss of temper.

Physical examination: This case turned out to be allergic conjunctivitis as confirmed later by the attending eye specialist in Khyber Hospital at Peshawar.

4. Sultan Jan; male; married; age 32

Residence: Qalai Nasro, Vlasvali Baghram, Villayet Parav, Paruvan

Occupation: Peasant, now Mujahid (fighter)

Place of exposure: Qalai, Nasro

Date of exposure: December 1981

Mode of delivery: Liquid from a bottle dropped in the water of the karez.

Effects: Vomiting and skin irritation and itching (for 10 days).

Present condition: He claimed that he still had a bitter taste in his mouth and sometimes he got hot flushes.

Further information: The water in the karez started bubbling up with a noise and evolved an offensive smell. Abrasions appeared on his feet after he dipped them in the water.

5. Salar; male; married; age 35

Residence: Qarabagh, Parwan

Occupation: Peasant

Place of exposure: Qalai, Nasro

Date of exposure: December 1981

Mode of delivery: Introduction of gas in the karez.

Effects: Throat irritation, chest pain, swelling of the stomach; skin became hypersensitive to sunlight.

Further information: The gas bubbled in the water in the karez, which evolved an offensive smell.

6. Haji Mohamad Usman; male; married; age 31

Residence: Nani, Ulasvali Andar, Ghazni

Occupation: Peasant, turned Mujahid

Date of exposure: Beginning on January 1982

Place of exposure: Mohd Dinkhel, Ghazni

Mode of delivery: Introduction of gas in the karez.

Effects: He fainted and recovered after one hour. He was given a saline drip and tablets.

Present complaints: He gets dizzy spells after sitting and experiences palpitations.

Physical examination: Nothing abnormal detected.

Further information: The Mujahideen had taken shelter in the karez. His companions were less affected. Weapon was shaped like a fluorescent bulb, about eight inches long. Yellowish smoke came out at both ends.

7. Faqir Gul; male; single; age 25

Residence: Ahmadkhel, Jagi, Vilayet Paktia

Occupation: Student

Place of exposure: Hassaukhel, Ulasvalitagi

Date of exposure: September 1981, after sunrise

Mode of delivery: Rockets from jet planes gave off a blue smoke.

Effects: Nausea and vomiting; felt better after putting wet handkerchief over his face.

Physical examination: Nothing abnormal detected.

Further information: The rocket was cylindrical in shape with a spongy material inside. Some Mujanideen took the canisters home. He said that he would try to obtain some rockets for examination by the Group, but he failed to deliver them.

8. Khazak, son of Alamdeen; male; age 55; married

Residence: Tangi, Wardak Province

Occupation: Soldier

Place of exposure: Tangi region, Wardak Province

Date of exposure: 5 December 1981

Mode of delivery: Bombs (blackish-grey or grey and red smoke).

Effects: The effects took some time to develop. The gas had a burning smell. Tearing, runny nose and irritation; vomiting and diarrhea, initially greenish and then bloody.

Physical examination: Nothing abnormal detected.

Present condition: Nothing significant.

Further information: For 24 hours he did not feel well. Some people remained affected for three days. In the village, 50 to 60 people died. There was severe contraction of their legs. A liquid was coming out of their noses and blood out of their mouths.

9. Gholam Mohomad; male; single; age 28; father's name: Abdul Ghafos
Residence: Mogkur, Gazni Province
Occupation: Mujahid
Place of exposure: Zarkashan, Mogkar, Gazni Province
Date of exposure: December 1980
Mode of delivery: Not specific; but mentioned shelling, bombing by planes and helicopters.
Effects: They felt dizzy, experienced choking and lost consciousness for two days. Then they started vomiting and had diarrhea with blood.
Physical examination: Nothing abnormal detected.
Further information: Among 30 groups totalling about 1,000 people, 24 persons were killed by bullets, about 40 persons died of gas, 60 persons were affected by gas and after two days, 3 of them also died. The gas had a rotten smell. On two occasions, he also saw some Russians wearing gas masks.
10. Bari Khan; male; age 40; married; son of Adam Khan
Residence: Zadran, Gardiz Province
Occupation: Mujahid
Place of exposure: Gardai City
Date of exposure: December 1980
Mode of delivery: Aircraft dropped bombs.
Effects: Unconsciousness, vomiting with bloody diarrhea.
Physical examination: Nothing abnormal detected.
Further information: Because it was too dark, he could not identify whether it was dropped from a jet or a helicopter.
11. Haji Khudai Nazar; male; age 30; married
Residence: Atal, Ghazni
Occupation: Teacher, now Mujahideen commander
Place of exposure: In a flat region - specific place unknown

Date of exposure: Not specified

Mode of delivery: The gas was pumped through a pipe from a tank into the karez.

Effects: Some died, their faces turned black and bodies decomposed very quickly. Those who survived, suffered from choking, bleeding nose and tearing eyes. Some lost their hearing.

Physical examination: Nothing abnormal detected.

Further information: Crossed over to Pakistan about two months ago.

12. Mohammed Akram; male; age 30

Residence: Lagher, Ghazni

Occupation: Theological student, now Mujahid

Place of exposure: Turghari in Ghazni

Date of exposure: First episode: June 1980; second episode: April 1981

Mode of delivery: First episode: four helicopters dropped bombs;
second episode: tank-borne pipes were lowered into a hole and gas was poured into karez.

Effect: First episode: he became unconscious and later developed diarrhea, nausea, dizziness and nose bleeding;
second episode: he developed nose bleeding but recovered after five days. Ten people died; their bodies were swollen.

Present complaints: None.

13. Dotani; male; married; age 40

Residence: Mazari Sharif, Balkh District

Occupation: Trader, Mujahid

Place of exposure: Mazari Sharif

Date of exposure: November 1980 at 10 p.m.

Mode of delivery: Shells exploding and evolving white smoke.

Effects: Watery eyes for two hours. Eating yogurt and buttermilk made them feel better. Fifty people died.

Present complaints: None.

Physical examination: Nothing abnormal detected.

14. Agha Jaai; male; married; 35 years

Residence: Herat

Occupation: Manual worker, Mujahid

Place of exposure: Herat

Date of exposure: August 1981

Mode of delivery: Airplanes (bombs); green smoke.

Effects: Unconsciousness for one or two hours.

Present complaints: None.

Physical examination: Nothing abnormal detected.

Further information: He was 20-50 metres away from the explosions.

15. Wali Mohammed; male; married; 45 years

Residence: Helmand Valley Uruzgan

Occupation: Peasant, now Mujahid

Place of exposure: Halachi

Date of exposure: 15 months ago (1980)

Mode of delivery: Helicopters dropped bombs that evolved a green and blue smoke.

Effect: Unconsciousness for half an hour; his lips became swollen.

Physical examination: Nothing abnormal detected.

Further information: All the other people who were with him became unconscious for a period of time.

16. Saifullah; male; single; 24 years

Residence: Waghaz, Ghazni

Occupation: Religious student, now Mujahid

Place of exposure: Mangari (first incident); Ashagual, South of Gasm (second incident)

Date of exposure: April 1981 (first exposure); October 1981 (second exposure)

Mode of delivery: First incident: bags dropped from airplanes which exploded in air or on the ground;
second incident: gas was pumped through 30- to 40-metre-long pipe into the hiding places.

Effects: First exposure (April 1981): tearing and blurred vision;
Second exposure (October 1981): four types of gas: the first caused asphyxiation and was offensive in smell; the second caused pressure on the heart; the third caused skin irritation; and the fourth caused burning of the skin.

Physical examination: Nothing abnormal detected.

Further information: Skin irritations did not last for more than 24 hours.

17. Abdul Zahir; male; single; age 22

Residence: Barki Barak, Logar

Occupation: Peasant, Mujahid

Place of exposure: Dobandi

Date of exposure: 2 April 1982

Mode of delivery: Helicopter (bombs).

Effect: After the attack, they drank water which made them sick. They complained of stomach upset and sore throat. Some persons were slightly injured.

Physical examination: Nothing abnormal detected.

Witnesses

1. Khwaja Mohammed (son of Sayed Mohammed)

Residence: Baghlan Province

Occupation: Mujahid

Place of exposure: Chaiyet, Tat

Date of exposure: January 1981

Mode of delivery: Bombs from helicopter.

Effects: People were suffocated by grey smoke, their eyes teared, they had vomiting and diarrhea with blood after 5-10 hours and felt dizzy.

Place of second exposure: Chiaab, Tahor Province

Date of second exposure: Summer 1981

Mode of delivery: Pipes pumped something into the cave.

Effects: About 12 hours after the attack, dead bodies were found in the caves. Those who removed the corpses were trembling, feeling dizzy and their eyes were tearing copiously. The bodies appeared decomposed, very soft and were coming apart.

2. Dowlat Khan; male; married; age 27

Residence: Mogur (Zabul Province)

Occupation: Mujahid (Commander of group)

Place of exposure: Karghan, Mukor District, Gazni Province

Date of exposure: September 1981

Mode of delivery: Shelling from tanks and bombs dropping from helicopters.

Effects: Tearing and salivation. His friends vomited blood and others were feeling dizzy and could not stand up. Six people died.

Further information: The bombs exploded after reaching the ground and evolved black smoke. Many died of suffocation.

Second incident: Battle took place in Behrana Mukhor area, Ghazni Province, in January 1982. Shells hit the ground and exploded and black smoke evolved, giving off a very offensive smell. Five people died after vomiting a lot of blood. Their bodies were black. About 60 to 70 others were affected. Vegetation turned yellow and dried up. Cows and goats died.

3. Moulvi Arsala Rahmani; male; age 50

Residence: Valayat Paktika, Utasvali Urgun

Occupation: Religious teacher, general commander of Paktika Group

Place of exposure: Ghazni Province

Date of exposure: June 1981

Mode of delivery: Small bombs dropped into the karez. He himself was not in the karez.

Effect: Everybody was killed. He saw the dead bodies; the flesh was very soft.

Second incident: Two persons were hit by bombs and died. Their clothes were burned and their flesh became soft and decomposed. A yellow and bloody discharge came out of the burned areas on the bodies. An Afghan spy who had been captured confessed that water was being deliberately contaminated. Some people who used such water had their eyes affected; others became deaf.

Third incident: In May 1981, a Russian who was captured and converted to Islam mentioned that poisons were being used and demonstrated the use of gas masks. The Russians were using a rifle with 40 rounds and the bullets made the victims shout and scream, which was unusual for Mujahideen.

4. Syed Agha; male; single; age 25

Residence: Mirahkel, Parwan

Occupation: Student, now Mujahid

Place of exposure: Mirakhal, Parwan

Date of exposure: January 1981

Mode of delivery: Helicopter dropped a bomb that evolved blue-black smoke.

Effect: 70 out of 3,000 to 4,000 Mujahideen died after four to five hours. Some had eye problems; others had difficulty breathing. He wet his handkerchief and breathed through it and he was not affected. His companions did not do so. Those that recovered experienced persistent tearing for one year. Although they are up and about, they still have mental problems.

Present complaints: None.

5. Mamur; male; single; age 17

Residence: Gardi Ghaus, Ningrahar

Occupation: Peasant, Mujahid

Place of exposure: Lughaki, Mohd Agha, Lugh Province

Date of exposure: September 1981

Mode of delivery: Aerial; there was a burst in the air and smoke turned red on reaching the ground.

Effect: 12 people died. He breathed through a wet handkerchief, got stiff and could not move.

6. Khushal Khan; male; age 33

Residence: Qalai Yusuf, Logar

Occupation: Military officer, now Mujahid

Place of exposure: Tangi Syedan, Chardeh, Kabul

Date of exposure: May 1981

Mode of delivery: Aerial; planes dropped bombs in wheat field, which evolved smoke.

Effect: People became unconscious. At the end of the summer, when people went to harvest the wheat, they started laughing abnormally and fell unconscious after eating the wheat flour.

Further information: Animals refused to eat the wheat. After the attack, the rate of growth of the wheat was very slow. He handed the Group a sample of the "contaminated" wheat.

Other sources of information

1. Gul Badin, Leader of Hizb Islami

He stated that the freedom fighters were fighting the Soviets in Afghanistan. In each Soviet division there was a chemical warfare unit. They used chemical weapons where other weapons failed, particularly to flush out or kill the fighters in the karez. Asked if there was anybody on his staff with military background to elaborate on the kinds of chemical agents used, he answered that they did not have experts in this field. But, in general, the agents usually caused dizziness and vomiting. He himself had never witnessed a chemical attack.

2. Haji Mohamed Ashur of Jalalabad, Haji Mira Jan of Puli-Khumari, Haji Sarbiland of Tagao and Malik Adam Khan Shinwari, all members of the United Islamic Liberation Front

They stated that they had received reports from people about chemical attacks, but that these people were still in Afghanistan. The reports refer to the following: Badakshan Province; villages: Tukshan, San Madgan. Gas was delivered from airplanes and by artillery shells. The whole area where the bomb explodes becomes black and there is an offensive smell. In Khandoz Province, 200 people are alleged to have been killed. The same day, Molasamed village was destroyed by gas attack. In Konar Province, subdistrict Nongalam, both conventional bombs and gas

bombs were used. In district Nongalam, villages Roganu, Turoboa, Mommarhill and Karma, 80 people were killed by gas attack. The bodies were black. There were similar attacks in the provinces of Charikan, villages Bulgri, Malikanab, Dekazi, Awalbaya, Payau, Totemdara, Insihatkhel.

On the banks of the river Panj - village Qalaizal, Shangar, Shani-Safed, Mujahideen were in the karez. The Russians brought a helicopter, got out and poured gas down the hole. At Tohat, they brought drills with them and made holes into which they poured the gas. I have no idea how they brought the gas.

Kartash village, 100 Mujahideen were saying their Friday prayers when they were attacked.

Province: Peshar, Borak; villages: Opram, Kushkoot, Husko, Kalifaser, and Obazak - gases have been used against these villages.

Province: Baklan; village Jarama - 150 men were killed. At Takangel, 25 people were killed by gas and bomb attack about September 1981. In Takan Province, village Daka, the water was poisoned by gas. Animals drank the water and they died. In the month of August, in Tahan Province, in the village of Telghan, black poisonous gas attacks from helicopters. Many people died and others got diarrhea.

When asked whether they had any gas masks or fragments of chemical weapons, they said that they had not learned about the Group except the previous day from the American Consulate.

3. Hazrat Sibghatullah Mujaddi

He stated that in May 1981 there was an attack by planes dropping bombs. Gas came out, the grass became black and people fainted. Furthermore, he stated that he was not sure if there was any evidence of chemical attack at Quetta.

Table 1. Summary of complaints from interviews of alleged victims in Pakistan

	Central nervous system			Gastro-intestinal tract										Respiratory tract			Skin			General			Other
	Dizziness	Headache	Unconsciousness	Vision disturbances	Nausea	Vomiting	Diarrhea	Constipation	Stomach ache	Pain	Difficulty in breathing	Cough	Cough with blood	Nose problems	Itch	Rash	Weakness	Fatigue	Behavioral disorder	Stiffness			
1	x			x	x	x	x					x											
2	x	x			x	x						x					x						
3			x																				
4															x								
5									x							x							
6	x					x																	
7	x																				x		
8				x		x	x						x										
9	x		x	x	B	B																	
10			x			x	x	x		B													
11		x				x	x								x	x	x						
12	x		x			x	x	x		B				B									
13			x	x																	x		
14			x																				
15			x																				
16				x									B										
17																					x		

ANNEX VI

Summary of statements made during interviews conducted by the
Group of Experts during its visit to Thailand in 1982

A. Alleged attacks in Kampuchea

Medical personnel

1. Dr. Andrew Wong, medical co-ordinator (World Vision), Sa Kaeo Camp

He has been working with refugees since 1979. From December 1979 to April 1980 he served at Ban Vinai; in August 1980, he moved to Kao I Dong and since June 1982 he has been at Sa Kaeo Camp.

He stated that he had not come across any cases in Sa Kaeo that could be attributed to chemical attacks and, furthermore, to his knowledge no allegations had been made in the camp in respect of chemical attacks. He assumed that, if such allegations had been made, they would have been brought to his attention at the regular staff meetings.

Asked by the Group about the prevailing diseases among the refugees, he said that infections, diarrhoea and respiratory problems were the most common diseases. He added that there were few cases of tuberculosis and malaria.

2. Dr. Sa Man; female; age 46
Residence: Phum Thmei
Occupation: Medical officer, Democratic Kampuchea

She had not witnessed a chemical attack, but she treated chemical casualties inside Democratic Kampuchea. Her first experience with those victims started in 1981 at O Srilao. Thirty patients were brought to the hospital suffering severe chest and abdominal irritation, vomiting and diarrhoea with blood, anuria bleeding from mouth and nose, headache and dizziness. Some of them lost consciousness. Some recovered soon, while others took a long time to recover. They were given intravenous fluids, penicillin, atropine, hydrocortizone, camphor, and up to 20 litres in some cases.

She also referred to a recent attack that occurred in Sra Lao Chrum. Casualties suffered from the same symptoms as in the first incident.

Alleged victims

1. Sureab Sarai; male; married; age 23

Residence: Battambang

Occupation: Farmer; formerly platoon leader in the Khmer People's National Liberation Front

Place exposed: Battambang

Date exposed: March 1980

Mode of delivery: 60-mm mortar landed two metres away from him.

Effect: Felt dizzy, vomited after 10 minutes, felt very weak, was unable to walk, fainted and was carried away

Present complaints: Not feeling well, double vision, giddiness, headaches, palpitations

Physical examination: Tachycardia (pulse 108 per minute regular with good volume), no other abnormalities detected

2. Tui Sarom, male; single; age 22

Residence: Kampong Thom

Occupation: Farmer; formerly a soldier of the Khmer People's National Liberation Front

Place exposed: Prao Town

Date exposed: 28 September 1982

Mode of delivery: Shell fell about 50 metres behind him.

Effect: Dizziness, vomiting, weakness especially of grip. He was taken to a doctor by his friend. He developed numbness of the left leg after 10 days. Ten days later developed swelling of the legs.

Present complaints: Generalized numbness; swelling of both legs

Physical examination: Not anaemic; pitting oedema of both legs; present pulse: 60 per minute, regular

Further information: His out-patient department identity card reads:
Tui Sarom; 22 years; weight: 60 kgs; T (temperature)
37C

Swelling of the body for five days

Diagnosis: Deficiency of vitamin A
Deficiency of vitamin B
Oedema both legs

Treatment: (a) vitamin B
(b) Multivitamins 1 x 3 x 10
(c) Lasix 1 x 1 x 4
(d) KCI 1 x 1 x 4.

3. Bin Boon Vorn; male; married; age 29

Residence: Battambang

Occupation: Soldier

Place exposed: Thun Ta Mao, Tro Polk Province

Date exposed: May 1980

Mode of delivery: A M79 round exploded 10 metres from him.

Effects: He felt dizzy, weak and fainted. He was taken to a hospital.

Present complaint: headache, dizziness, poor vision, excitability.

Physical examination: Left facial palsy; diminished vision.

Further information: He was under treatment in the hospital for trachoma and corneal ulcer. Seen with out-patient department identity card on 30 October 1982. Name: Bun Norn; 22 years; male.

Complaints:

20 June 1982: irritation, papillary hypertrophy,
Herbert's pit, corneal scar.

Impression: Herbert's trachoma

Treatment: synthemycetin.

8 August 1982: still follicula on the upper
conjunctiva and with opacity of the
cornea; still with photophobia.

Treatment: synthemycetin.

4. Yean Moeun; male; single; age 25

Residence: Democratic Kampuchea

Occupation: Combatant of National Army of Democratic Kampuchea

Place exposed: Takaan in Battambang Province

Date exposed: First episode: 1 September 1981
Second episode: 2 February 1982

Mode of delivery: First episode: mines exploded, evolving greenish smoke;
Second episode: explosion of 55-mm mortar shell five metres away from him.

Effects: Symptoms of first and second episodes were similar: chest pains, nausea, generalized weakness, dizziness followed by loss of consciousness.

Present complaints: None.

Further information: During the first episode, five people died on the spot.

5. Yin Noeun; male; single; age 27

Residence: Democratic Kampuchea

Occupation: Combatant of National Army of Democratic Kampuchea

Place of exposure: O Trang region

Date of exposure: February-March 1980

Mode of delivery: Poisoning of water stream.

Effects: Trembling, vomiting, diarrhoea, loss of consciousness for a day.

Further information: No change in taste or colour of water. Twenty people died.

6. Mak Chheay; male; single; age 27

Residence: Phum Thmei

Occupation: Hospital worker

Place of exposure: Ko Kong

Date of exposure: November 1981

Mode of delivery: Plane sprayed yellow substance that poisoned water stream.

Effects: Six minutes after drinking the water he had fever, pain in the chest and experienced suffocation, vomiting and bloody stools. Three to four people experienced similar symptoms and two died.

7. Dy Van; male; single; age 26

Residence: Phum Thmei

Occupation: Hospital worker

Place of exposure: Ko Kong

Date of exposure: November 1981

Mode of delivery: Poisoned water.

Effects: Washed mouth and face. Five minutes later he became dizzy. Fifteen days later he got diarrhoea.

Further information: He did not notice change in taste or colour of water.

Other sources of information

1. Chea Chut; male; married; age 40

Residence: Nong Chan Camp, originally Svey Rielg

Occupation: Leader at the camp

He stated that he himself had not been exposed to chemical attack, but there were people in the camp who claimed that they had been exposed. The first time he heard about chemical attacks was in 1980 from refugees from Kiri Province. He saw people who had been exposed to chemical attacks and they were generally weak and often fainted. He used to refer simple cases to the camp doctor but he referred serious cases to a hospital.

2. Toth Kim Seng; female; single; age 35
Occupation: Secretary-General, Red Cross of Democratic Kampuchea

She mentioned that she had been following cases pertaining to chemical attacks. In February 1982, all 17 serious cases that had been treated in a nearby hospital recovered. Asked by the Group if she knew which areas of Kampuchea had been exposed to chemical attacks, she stated that chemical attacks had occurred in different parts of the country. When the Group inquired whether she had kept records of such attacks, she responded that it was very difficult to keep such records. She added that the Democratic Kampuchea Red Cross collected information regarding chemical casualties all over Kampuchea and had contacts with other relief organizations.

3. Rev. Fr. Bunlert Tharachatr, Executive Director
Dr. Jidbhong Jayavasa, Medical Co-ordinator
Catholic Office for Emergency Relief and Refugees, Bangkok

They stated that they had visited the Kampuchean village of Sok Sann shortly after a series of alleged chemical artillery attacks that had commenced on 29 October 1982. The target area had been mainly outside the perimeter of the village, with only one shell exploding within the village, but "yellow smoke" had nevertheless drifted into the village. The community derived its water supply from a small stream at the perimeter of the village and persons who drank water from that stream following the attacks developed diarrhoea and vomiting within a time period ranging from a few hours to one day. Twenty-seven persons had been affected to varying degrees but only two of them had developed bloody stools. Dr. Jayavasa had himself examined one of the alleged victims but had been unable to detect any signs of skin or mucous membrane lesions or any significant chest or abdomen symptoms, but the patient had developed a slight fever. The overall impression had been suggestive of some kind of an infection.

A number of samples said to have been collected in the village of Sok Sann after the alleged attacks, were handed over to the Group by Father Tharachatr and Dr. Jayavasa. For details concerning these samples, see annex IV (samples 5 to 7).

B. Incidents in Thailand

Medical personnel

1. Prakongsri Waehara; male; single; age 22
Residence: Ban Sa Tong
Occupation: Health officer
Place of attack: Ban Sa Tong
Date of attack: 19 February 1982

About 9.00-9.30 a.m., he saw a plane that circled over the village. Around 10 a.m. the villagers came and told him that some yellow powder had been noticed in the village. He collected samples from the house of a villager named Mr. Kam, where the powder was more abundant, and gave them to the border patrol policemen. He then went to investigate the incident and took some leaves back to his office and radioed a report to the authorities. Later some border patrol policemen came and asked for samples, which they took with them. They also collected some samples on their own. The authorities ordered the villagers not to drink the water. The provincial health officials arrived on the same day. He did not know whether other doctors from Bangkok had arrived on the scene to investigate the matter. A week later, a team of doctors from the district hospital came and examined the patients.

2. Ounruen Prateep; male; single; age 27
Residence: Ban Sub Tha Mau
Occupation: Village health officer
Place of attack: Ban Sub Tha Mau
Date of attack: 19 February 1982

He had not seen the plane but he saw the yellow substance covering the village and the water tank at the back of the health office. The villagers washed the substance from their houses but the next day the yellow substance reappeared. He warned the villagers not to drink the water from the village reservoir that had been exposed to yellow substance, after which he radioed the provincial authorities and reported the incident. Seven or eight days after the attack, the villagers started to complain of headaches, diarrhoea and dizziness. He also noticed that some of the villagers had developed a rash; however, none of them asked to be treated. He administered tetracycline and sulpha to those who were suffering from diarrhoea and they recovered after one day. A 13-year-old boy, however, had developed dark vomitus, dark bloody stools and bleeding of the nose and mouth. He was transferred to the provincial hospital for treatment and there he was diagnosed as suffering from malaria.

Alleged victims

1. Tanyavudhi Kam; male; married; age 64

Residence: Ban Sa Tong

Occupation: Farmer

Place exposed: Ban Sa Tong

Date exposed: 19 February 1982

Mode of delivery: Unspecified.

Effect: Fatigue, loss of appetite, tendency to constipation.

Present complaints: Believes his health has deteriorated; frequently suffers from common cold.

Physical examination: Nothing abnormal detected.

Further information: Many people became sick. He did not observe any animals dying. However, some "tailor ants" died.

2. Tueykratoke Kam; male; married; age 57

Residence: Ban Sa Tong

Occupation: Farmer

Place exposed: Ban Sa Tong

Date exposed: 19 February 1982

Mode of delivery: Aerial spray.

Effect: Drank water three days after the attack. Within five to six days he had bouts of vomiting and the vomitus was blood-stained. He felt dizzy and also developed joint pains.

Present complaints: Vomiting continued for one month; difficulty in breathing, especially at night. He has not consulted a doctor.

3. Sangchand Mun; male; married; age 39

Residence: Ban Sa Tong

Occupation: Farmer

Place exposed: Ban Sa Tong

Date exposed: 19 February 1982, 2:30 p.m.

Mode of delivery: Unspecified.

Effect: After handling the yellow substance, he washed his hands. He suffered from headache and stomach-ache.

Present complaints: None.

Further information: He had noticed some yellow substance on the roof of his neighbour's house; he collected a sample and gave it to the health officer.

4. Kumkunmuang Pan; male; married; age 44

Resident: Ban Sub Tha Mau

Occupation: Farmer

Place exposed: Ban Sub Tha Mau

Date exposed: 19 February 1982, between 9 and 10 a.m.

Mode of delivery: Unspecified.

Effect: Developed general weakness.

Present complaints: None.

Further information: His children and neighbours became sick. He noticed the yellow substance on plants and the ground in the areas surrounding his house as well as on the veranda.

5. Jumphasri Pranee; female; married; age 24

Residence: Ban Sub Tha Mau

Occupation: Farmer

Place exposed: Ban Sub Tha Mau

Date exposed: Beginning of the year

Mode of delivery: Unspecified.

Effect: Diarrhea.

Present complaints: None.

Further information: Neither her children nor the dogs were affected. She saw the yellow substance on the roofs of several houses.

6. Srikhum Pramua; male; married; age 52

Residence: Ban Sub Tha Mau

Occupation: Farmer

Place exposed: Ban Sub Tha Mau

Date exposed: 19 February 1982, in the afternoon

Mode of delivery: Unspecified.

Effect: Diarrhea.

Present complaints: None.

Further information: People in the village got mild diarrhea. Animals were not affected. Plants developed dry patches.

Eye witnesses

1. Sornnila Ta; male; age 54; married

Residence: Ban Sa Tong

Occupation: Farmer

Place of attack: Ban Sa Tong

Date of attack: 19 February 1982

Mode of delivery: Unspecified.

He was working on his land, which is about three kilometres north-east of the village. On his way home, at about 5 p.m., he noticed some yellow powder on the vegetation and when he arrived home he found yellow powder on the lid of the water container. He heard the villagers talking among themselves regarding some yellow substance that had been disseminated from a plane. Subsequently, he used water from the village reservoir to wash the lid of the container and dried it with a cloth. He noticed that, wherever the yellow powder had touched the leaves, the latter developed dry spots. Asked whether any animals had been affected, he stated that only "tailor ants" had died. No member of his family developed any ill effects and he did not know whether any of the other villagers were affected.

2. Dhamruka Korn; male; age 53; married

Residence: Ban Sa Tong

Occupation: Storekeeper

Place of attack: Ban Sa Tong

Date of attack: 19 February 1982

In the afternoon, while he was in the store, he heard a plane but did not go out to look. Soon after that he heard people talking about a yellow substance that had been scattered over the village. Later, when he left his store he saw the powder on the corrugated iron roofs and on vegetation. The substance that fell on the roofs was powdery; when he touched some of the substance that had sunk to the bottom of the bucket, it felt spongy to the touch. He emptied the bucket but it remained spotted with the yellow

substance for many days. Dry spots also appeared on the vegetation after two days. After members of his family had bathed themselves with water from an uncovered jar, they developed itching of the skin and their eyes became affected.

3. Homvong Pueng; female; married; age 78

Residence: Ban Sa Tong

Occupation: Housewife

Place exposed: Ban Sa Tong

Date exposed: 19 February 1982

Mode of delivery: Unspecified.

Effect: None.

Present complaints: None.

Physical examination: Nothing abnormal detected.

Further information: "Tailor ants" died. Her grandchildren who were at school, were not affected.

4. Premprasit Sutin; male; married; age 60

Residence: Ban Sa Tong

Occupation: Farmer

Place exposed: Ban Sa Tong

Date exposed: 19 February 1982

Mode of delivery: Unspecified.

Effect: None.

Present complaints: None.

Further information: His seven-year-old son was not affected. He saw yellow spots on the roof of his house and on vegetation.

Other sources of information

1. Boonyapipatana Sachart; male; married; age 42

Occupation: District Officer of Pom Nam Ron

The two villages of Ban Sa Tong and Ban Sub Tha Mau were affected by the yellow substance. These villages which are in the sixth district of Chantaburi Province, are located only 12 kilometres from the border with Kampuchea. One day, before the incident occurred, in February of this year, an incursion into Thailand had taken place about 4 km from the border in which five border patrol policemen had lost their lives. At about 8:30-9:00 a.m. the villagers observed a single-engine aircraft, without any identifying markings, that disseminated a yellow substance on the area. The plane, which was painted white, remained in the area for about eight or nine minutes. Most of the yellow substance was concentrated in the area around the village reservoir. Samples were collected and sent to higher authorities in Bangkok. The District Officer received word from the health authorities that the yellow substance was toxic. He also stated that a greater amount of the substance was scattered over Ban Sa Tong than at Ban Sub Tha Mau. One or two persons had complained of skin rash and they had been examined by local health officials.

Water samples had also been collected and sent to higher authorities at Bangkok. He stated that plants and animals in the area had not been affected.

When the Group inquired whether the results of the analysis indicated that the water from the reservoir should not be consumed, he stated that that had not been the case.

2. Fechanont Suksant; male; age 57; married

Residence; Ban Sub Tha Mau

Occupation: School headmaster

Place of attack: Ban Sub Tha Mau

Date of attack: 19 February 1982

He has been a teacher in the village for four years. He heard the noise of a plane in the afternoon but, since he was inside the house, he did not see it. Three days later he began to hear stories concerning the yellow substance. He had not noticed any undue absence on the part of the students, in the aftermath of the incident, nor had he heard of anyone developing an illness directly related to the yellow substance. However, he had been told that some people in the village about 10 kilometres away had suffered badly and had received treatment. Subsequent to the attack he had filled the trough in his bathroom with water from a jar that was kept outside and apparently had been exposed to the yellow powder. He noticed that insects that came in contact with the water died and that a frog that jumped into the water also died immediately.

3. Kromlang Chamlong; male; age 36; married

Residence: Ban Sub Tha Mau

Occupation: Assistant headman of the village

Place of attack: Ban Sub Tha Mau

Date of attack: 19 February 1982

It was early in the morning when he left his house to fetch water and saw a plane that did not bear any markings. Later, he spotted some yellow substance. He reported the incident to the village headman since on an earlier occasion he had heard radio broadcasts that spoke of the use of "yellow rain" in Kampuchea. The headman warned the villagers to keep away from the yellow substance and reported the incident to the radio unit, which in turn reported it to the higher officials. As a result, doctors and district officials came to the village, and he helped them in collecting samples. The samples that were collected were not taken from the roofs or the water reservoir but from the ground and the vegetation. The authorities advised the villagers to cover the water jars and not to consume any vegetables that appeared to be contaminated. The villagers did not manifest any adverse symptoms except for diarrhea, which they developed about 15 days after the incident had occurred.

4. Wittaya Koranee; male

Residence: Bangkok

Occupation: TV reporter with Channel 7, Bangkok

He lost his way while travelling by car to cover news of fighting at Sub Ta Lee village. He stopped at Sub Tha Mau for a drink. The villagers who recognized the TV-station car asked him to go and examine the yellow substance that had fallen all over the place. He could not identify the substance but he requested the camera man to film the areas covered with the yellow substance. The villagers told him that at 10 o'clock an aeroplane had circled three to four times and dropped some yellow substance in the area near the water reservoir. The health officials had taken samples of leaves to the provincial health authorities. He went to the provincial health office but nobody was there. He saw yellow spots on roofs, water jars and the ground as being evenly distributed. He did not notice it on the bodies and clothes of the villagers and none of them complained of any ill effects but they appeared frightened and apprehensive. They stayed in the village for two hours but did not touch the substance.

He did not attach much importance to this because he had never heard of such an incident occurring earlier in Thailand. He had only covered domestic news.

He advised the villagers not to drink the water from the reservoir. He returned to the village the next day and saw a sign reading "do not drink water".

5. Panat Maleehoan; male

Residence: Bangkok

Occupation: Driver with TV-station channel 7, Bangkok

Date: 19 February 1982

He got lost because he was not familiar with the area. When he asked the villagers they directed him to proceed onwards but, after driving for some time, he came across construction workers who told him that he was heading the wrong way. He stopped for a drink at the local store where he chatted with the villagers. They reported that a plane had dropped something yellow that morning. He saw the yellow substance on the roofs, balconies of houses, plants and water jars. Probably half the houses in the village were covered, especially the area near the reservoir. He reported it to the police. He did not see any villagers get sick. He stayed in the village for half an hour. He had never heard stores about yellow rain before.

C. Alleged attacks in Laos

Medical personnel

1. Dr. Ocampo Teofilo; male; age 50

Residence: Nong Khai Camp

Occupation: Physician, Catholic Relief Service (CRS)

He said that the camp was now officially closed and that since 1 March 1982 only 15 refugees had arrived there: five males, six females, three boys and one girl. He had not heard from them any complaints related to chemical weapons attack. Nor had he met any victims of chemical attack. Even before arriving at the camp, while still working along the Kampuchean border, he had not seen anyone who had been exposed to a chemical attack. Asked about medical records, Dr. Teofilo mentioned that medical records had been kept but at present they could not be located since they either had been transferred to another place or had been burned. After being kept for a year, all the records that were burned belonged to refugees who had now been relocated in third countries. When questioned about the most common diseases among the refugees, he stated that the most prevalent diseases were malaria, anemia, parasitism and malnutrition.

2. Dr. Stafford D. Bourke

Residence: Ban Vinai Holding Center

Occupation: Medical officer since March 1982

He is a medical co-ordinator with World Vision and has come in contact with a number of people who claim to have been "gassed". He listened to their stories very carefully and examined them in order to determine whether the complaints were related to the diseases prevalent in South-East Asia. He stated that, based on his examination, the cases of skin diseases he had encountered had been atypical. He could not confirm that any of the people he had examined had been exposed to chemical attacks, although many of them claimed that their symptoms had commenced after exposure to such attacks. He examined a child who had been very sick and diagnosed the case as measles. When he asked the mother of that child about her other children, she had replied that seven of them had been "gassed" and only one of them had survived. Two died immediately; five of them who had developed bleeding from the mouth had been admitted to the hospital but had died shortly thereafter. She also told him that 160 people had suffered from bloody diarrhoea after they had been exposed to the gas and had died after three days.

He stated that he and Dr. Bird, another physician on the medical staff of the camp, had prepared a questionnaire for all patients who visited the hospital. In cases of alleged recent exposure, he would take blood samples and send them to Bangkok in order to make them available to any embassy that might be interested in carrying out an analysis. He stated that, on 16 April 1982, 213 refugees who had crossed the Mekong River claimed that they had been "gassed" and that 38 of them had become ill as a consequence. In addition, a four-year-old child and an old man had died after the attack. He and Dr. Bird had gone down to the river to examine the refugees and noticed that two or three of them had a strange rash on their bodies. Aside from that particular symptom, their general condition was no different than that of any refugee who has been travelling for a long time. He took blood samples from those who were affected and sent them to Bangkok for analysis but no positive results had been obtained. He had later come to the realization that a significant fact about the refugees who had become sick as a result of "gassing" were either children under 12 or people over 60.

A number of people claimed that their condition improved after taking opium. It took them about a week to reach the camp. One or two of them claimed to have blood in the urine and the stools.

He mentioned that Dr. Amos Townsend came to the camp and showed considerable interest in the patients who claimed to have been "gassed". He requested that blood samples from those affected be sent to him. World Vision instructed Dr. Bourke to make blood samples available to embassies at Bangkok as required.

Dr. Bourke showed the Group the medical records and the files containing the completed questionnaires referred to above.

3. Andrea Crossland, female

Residence: Ban Vinai Camp

Occupation: Registered nurse, midwife (epidemiologist), International
Rescue Committee

During last year, she had been involved with disabled refugees, some of whom had told her that they were experiencing chest problems as a result of exposure to chemical warfare. According to her, since 15 September 1982, she had been dealing specifically with persons exposed to chemical warfare, in association with Dr. Townsend.

She pointed out that, in 1980, people complained more of nose bleeds, headaches, joint pains and muscle spasms. At present, though the symptoms are of a different nature, cases of bleeding are less frequently reported and the vomiting and diarrhoea reported appear to be of a less severe nature. Skin affections, however, are more evident.

Alleged victims

1. Phetchomphu Houmpham; male; age 34; married

Residence: Souvan Nakhet, Laos

Occupation: Soldier, with rank of lieutenant

Place of exposure: Muono Svi, Sienokhvong

Date of exposure: 11 December 1981

Mode of delivery: Double-winged single engine airplane disseminated a smoke.

Effect: He was under shelter. Three days later, he developed itching of the skin and coughed blood. He was treated for 20 days in a hospital.

Period of recovery: Cough persisted for 15 days and rash for a month.

Further information: Did not recognize the colour of the substance but it seemed either yellow, white or red. Plants were affected and animals appeared lethargic.

2. Seng Pao Moua; married; age 32

Residence: Phu He

Occupation: Farmer

Place exposed: Phu He

Date exposed: March 1982

Mode of delivery: Heard a plane flying but did not see it dropping anything.
Later, he noticed yellow spots on his shirt and skin.

Effects: After 30 minutes, he had double vision, vomited blood, suffered pain
in the chest and had skin rash with pus.

Duration of disease: 20 days; presently he has no problem.

Physical examination: Nothing abnormal detected.

Further information: Dogs that ate polluted rice died. He collected samples
and gave them to Thai authorities.

3. Lor Xiong; male; age 15

Residence: Phu He

Occupation: Farmer

Place of exposure: Phu He

Date of exposure: March 1982

Mode of delivery: Noticed some yellow substance on his shirt but did not know
how the substance was disseminated.

Effects: Itching, vomiting and coughing blood; stomach problems the
following day.

Physical examination: Nothing abnormal detected.

Further information: One old woman died; a chicken also died. His mother and
to sisters were also affected.

4. Ly Leo Pao Xiong; male; single; age 16

Residence: Phu He

Occupation: Farmer

Place exposed: Phu He

Date of exposure: Not sure

Mode of delivery: Heard a plane; saw yellow spots on leaves and ground.

Effects: Skin itch the next day and then rash. Asked if he had any other problems, he said he had none. Asked later whether his nose, eyes or chest had been affected in any way, he said he had pain in the chest, double vision, diarrhoea and vomiting with some blood.

Duration of disease: One day.

5. Song Yang; female; age 35; married

Residence: Nam Ja

Occupation: Farmer

Place exposed: Nam Ja

Date exposed: 1980 harvest time (October-December)

Mode of delivery: Two planes dropped rockets. The substance that came out was yellow in colour.

Effects: Children went out to play and when they returned they had diarrhoea, vomiting and frothing from the mouth. Two children died after two hours.

Further information: Soldiers came and took them away. Ten days later their mouth became swollen with lesions and their teeth fell out. After one and a half months the rest of the children died.

6. Youa Vang; female; age 23; married

Residence: Ban Don, Long San

Occupation: Not specified

Place of exposure: Ban Don

Date of exposure: November 1980.

Mode of delivery: Heard from someone that a plane had dropped something.

Effect: The stems of tapioca plants withered and died. The trees became rotten. When tapioca was fed to pigs they died. Twenty days later she went to the rice field and on arrival she experienced headache, dizziness, blurred vision and spells of vomiting. She could not sleep that night and remained sick for six months.

Further information: The rice field was affected and the crops gave a lower yield. When pigs were fed rice from that field, they died. After arriving at the camp she gave birth to a baby that "looked green in colour". Later, its condition improved but it subsequently turned green again and died.

7. Ying Yang; male; age 19; married

Residence: Pha Chong

Occupation: Farmer

Place of exposure: Nam San

Date of exposure: 18 October 1982

Mode of delivery: He had seen a plane circling overhead at about noontime. At about two o'clock, he noticed some yellow substance on the leaves and collected a sample that he handed over to the Group during the interview.

Effects: At five o'clock, he felt dizzy and felt as if his eyes were "coming out". He had diarrhoea and vomiting. He took opium. After one day he developed itching and skin rash. He stated that he still suffered from chest pain and diarrhoea. Asked if he had seen the camp doctor, he stated that he had done so but no medication had been administered.

Physical examination: Extensive rash on abdomen, axillae, groin, buttocks, feet and between toes. Further examination by two dermatologists revealed that the case was fungus infection (tinea corporis).

Laboratory tests: Skin scraping: positive for fungus
Blood picture: no leucopenia
Blood test for trichothecene: negative

8. Vang Chue Kee; male; age 26; married

Residence: Phu He

Occupation: Farmer

Place of exposure: Between Phu He and Nam Sam

Date of exposure: 18 October 1982

Mode of delivery: He heard a plane flying at noon but did not see it. Later he went to the rice field and saw a yellow substance on the leaves and the ground. He was with Ying Yang (see previous interview).

Effects: He felt dizzy and as if his eyes were "coming out". He took some opium and felt better. Next day blood came out of his nose and he developed diarrhoea. However, he did not experience any vomiting but experienced palpitations.

Duration of recovery: One week; but still had trouble with his ears and was experiencing nose irritation and sneezing.

Physical examination: Extensive skin rash all over the body. After consultation with two Thai dermatologists the case was diagnosed as tinea corporis and tinea versicolor.

Laboratory test: Skin scraping: positive for fungus.
Blood picture: no leucopenia.
Blood test for trichothecenes: negative.

9. Mai Vang; male; age 15; single

Residence: Phu Sao

Occupation: Farmer

Date of Exposure: June 1981, at noon

Place of exposure: Phu Sao

Mode of delivery: After hearing a plane that had flown over, he noticed a yellow substance on the ground.

Effects: Dizziness, later headache, double vision and felt "as if his eyes were coming out". During the night, he developed diarrhoea, vomiting and palpitations. He took opium.

Duration of recovery: 20 days.

Further information: His family of five were similarly affected. His mother and sister recovered first. Other families were also affected. One family died. Rice plants (paddy) turned yellow and died. A horse that was fed polluted corn developed convulsions and died.

10. Kao Moua; male; age 28; married

Residence: Phu He

Occupation: farmer

Date of exposure: April 1981

Place of exposure: Ban Pha Ngung

Mode of delivery: Not specified but noticed yellow substance on food and on tent.

Effects: Headache, blurred vision, diarrhoea with blood, vomiting. Felt as if drunk and "as if his eyes were coming out". He was gasping for breath. He took opium for treatment.

Further information: The substance was milky at first and dried up later. Six persons were affected and were very sick.

11. Kai Lor; male; age 29; single

Residence: Phu He

Occupation: Farmer

Place of exposure: Phu He

Date of exposure: 15 September 1982

Mode of delivery: Airplane (but he did not see it)

Effects: Dizziness, blurred vision, diarrhoea and fever. After five days he developed itching of the skin. He smoked opium and felt better.

Further information: His brother was affected but to a lesser extent. One woman and her husband ate contaminated food; she died but the husband who smoked opium survived.

12. Ly Ton Vang; male; age 28; married

Residence: Phu Chia

Occupation: Farmer

Place of exposure: Nam Pon

Date of exposure: 8 April 1982-25 April 1982

Mode of delivery: Spraying by helicopter

Effects: The substance produced holes in the leaves. He had not been affected because he protected himself with a piece of cloth. His mother, wife and sister suffered from blurred vision, headache and epileptic fits and lost consciousness. After using opium, their condition improved.

Further information: He picked up some samples, which he later gave to Dr. Townsend.

13. Vang Chu; male; age 22; married

Occupation: Farmer

Residence: Phu He

Place of exposure: Paa Ngun

Date of exposure: 10 March 1982

Mode of delivery: After a helicopter had flown by, he noticed a milky substance covering the surroundings. The substance dried up after a while.

Effects: Two days later, he developed blisters on his hands. There was no pain or itch. He also felt dizzy. Those who ate polluted food developed diarrhoea with blood, pain in the eyes with tears, chest pains, cough and runny nose.

Duration of recovery: One day for cough; one week for diarrhoea; one month for itching.

Further information: Brought over samples and gave them to the Hmong leader.

14. Nao Thao; male; age 22; single

Residence: Phu He

Occupation: Farmer

Place of exposure: Pan Wong area

Date of exposure: 20 June 1982

Mode of delivery: Unspecified, but saw the yellow substance falling.

Effects: Headache, runny nose, diarrhoea, pain in the throat and chest.

Duration of disease: One day.

Further information: Six persons were affected. They took opium with lemon grass. The others improved but he did not. Two other persons died. He collected samples of the yellow substance, which he brought over to Thailand. He was taken to Bangkok for treatment by representatives of the United States Embassy.

15. Xiong Pao Her; male; age 25

Residence: Pha Mai

Occupation: Farmer

Date of exposure: 1978

Place of exposure: Pha Mai

Mode of delivery: Heard the sound of a jet. Later, he saw the yellow spots on tree leaves and on vegetables but not on the ground.

Effects: One hour after eating vegetables, he felt pain in his eyes but his eyes did not tear. He also coughed. He took herbal medicine.

Further information: Ten persons ate vegetables and developed diarrhoea. After one day, three children died; the next day, four others died.

Alleged eyewitnesses

1. Xai Kur Lor; male; age 45; married

Residence: C/4, Q/3, B/1, R/I, KM52

Occupation: Farmer

Date of attack: August 1982

Place of attack: KM52

He witnessed an attack three months earlier, 52 kilometres from where he lived, at about 2 p.m. A plane that looked like a B-52 flew over and sprayed something. Two of his nephews went for a swim in the river. They felt dizzy and had to be pulled out of the river. There was some black substance clinging to their bodies. They suffered from vomiting and diarrhoea. They took opium and the dizziness stopped, but the diarrhoea lasted for 10 days. Asked whether he had been able to distinguish the substance that the plane had sprayed, he replied that it was yellow in colour.

D. Other sources of information

1. Vang Meng; male; age 40; married
Residence: Ban Vinai Camp
Occupation: Hmong leader

He stated that, in the camp, he had come across over a hundred victims of chemical attacks and that he had reported them to the camp doctors. A group of victims had arrived between 27 and 28 of October 1982 and had brought along some samples with them that they intended to hand over to the Group.

He added that, based on what the refugee had said, the use of chemical weapons was continuing in Laos. According to the alleged victims, the Lao officials had told them that it was the Americans who had subjected them to gas attacks. Furthermore, the Lao officials had not administered treatment to the casualties.

2. Song Leng Xiong; male; age 43
Residence: Phu Chia
Occupation: One of the Hmong leaders
Date of attack: 18 August 1981
Place of attack: Poa La Tan

He came to the camp on 6 September 1982. He was never exposed to a chemical attack but, in August 1981, he had seen a plane at a distance. He had not seen the plane drop anything but others told him that it had, in fact, dropped red and black smoke. Fifteen days after the incident, he went to the village of Poa La Tan and found that the people were suffering from diarrhea, fever, weakness and that their skin was pale. One hundred forty persons out of 470 persons had been affected; 15 persons died. All animals in the area died. He had not noticed anything on the leaves of the plants.

He added that he had received information that the government officials in Laos distributed some type of powder to some people and asked them to dissolve it in water and to inject the solution into vegetables in order to poison those who would consume the vegetables. He had received a sample of the substance from a person who told him that it could also be used in 105 mm artillery shells or could be sprayed from an aircraft. He gave the Group a sample of this substance.

Asked if he had himself seen any victims, he said that, in August 1982, when he was in Poa La Tan, he was informed by the district officer that there had been two victims there. A young girl's arm was affected through exposure to a chemical attack and eventually she lost the arm. She later died. After eating food contaminated with the toxic substance, another girl's face became swollen and her teeth fell out. Subsequently, she also died.

3. Dr. Amos Townsend, International Rescue Committee, Bangkok

Dr. Townsend had been interviewed by the Group during its previous visit to Thailand and once again the Group met with him, upon his request, at ESCAP on 6 November 1982.

He mentioned that he had been involved in gathering information and samples and in conducting examinations among the Hmong in Loei and Nong Khai provinces and to some extent alleged chemical weapons victims among the Khmer Rouge soldiers. He stated that he had been on full time loan to the United States Embassy at Bangkok since January 1981. Since 1 September 1982, Mrs. Andrea Crossland, a midwife, had been associated with him in the collection of information and of samples. Dr. Townsend stated that he had often handed over samples that he had obtained to the United States Embassy at Bangkok and to private laboratories in the United States. He added that he had not, however, been apprised, in all instances, of the results of analysis from those laboratories.

He informed the Group that malaria was still prevalent in the region but that the incidence of malnutrition was now much less than in the past.

He conveyed to the Group his impression that chemical weapons agents of lethal and non-lethal varieties had been in use in South-East Asia since at least 1975 in Laos and at least since 1979 in Kampuchea.

Dr. Townsend further stated that, when he had met the Group last year, he had already been convinced that chemical weapons were being used in South-East Asia and that, based on subsequent reports he had been receiving from alleged victims and witnesses, he saw no reason to alter his earlier conviction. It was his feeling, moreover, that the objective in utilizing such weapons was either to subdue the Hmongs or to drive them out of their country. In addition, he maintained that "the use of chemical weapons agents against the Hmong is in the form of basic field experimentation, using the 'human laboratory animal' in his natural setting".

Table 1. Frequency of ailments derived from monthly attendance records at Ban Sa Tong Village Health Centre in Thailand

	<u>February (15-28) a/</u>	<u>March (1-31)</u>	<u>April (1-30)</u>	<u>May (1-31)</u>
Injuries	13	23	28	21
Eye conditions	5	15	6	6
Ear, nose and throat conditios	3	4	5	8
Respiratory tract disturbances	61	98	92	47
Gastro-intestinal tract disturbances	26	73	52	43
Skin conditions	7	41	30	26
Headache	11	28	17	17
Fever of unknown origin	11	39	35	38
Weakness	20	70	47	43

a/ Yellow substance appeared on 19 February 1982.

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Table 2. Summary of complaints from interviews of alleged victims in Thailand

Interview No.	Central nervous system					Gastro-intestinal tract					Respiratory tract					Skin			General			Other
	Dizziness	Headache	Tremors	Unconsciousness	Vision disturbances	Nausea	Vomiting	Diarrhoea	Constipation	Stomach ache	Pain	Difficulty in breathing	Cough	Cough with blood	Nose problems	Itch	Rash	Rash pus	Weakness	Fatigue	Fever	
KV 1	x			+	x		x												x			Lasted for half a month
KV 2	x						x															Numbness of leg
KV 3	x																					
KV 4	x			x		x				x												One died on the spot
KV 5				x		x																20 died
KV 6		x		x		x	x		x	x	x											Two died 5-6 minutes after drinking
KV 7	x							x	x		x											Washed face and mouth only
TV 1																				x		Chicken died
TV 2	x					x																Vomiting after 5-6 minutes
TV 3																						Tailor ants died
TV 4																						
TV 5		x																				Tailor ants died
TV 6								x											x			
TV 7				x				x														
TV 8								x														
LV 1												x			x							
LV 2				double		x	B			x							x					Animals died; no men died
LV 3						x			x						x							One died
LV 5				double																		One died
LV 5						x	x															Two children died Teeth came out
LV 6	x	x		could not see		x																Could not sleep
LV 7				feeling of exophthalmus		x	B	x		x		x			x							
LV 8				feeling of exophthalmus				x					bleed			x						
LV 9				feeling of exophthalmus		x	x															Horse died after 30 minutes One family died. Plants died
LV 10		x		blurred		x	x	B		x												25 yards from substance
LV 11								x							x						x	An old lady died after 2 hours
LV 12		x	x	blurred																		Holes in the leaves No deaths
LV 13		x				x	x	B		x		x	runny									Holes in the leaves. Hand rotted
LV 14													runny									Two people died. Animal died
LV 15		x		blurred				x														
TOTAL	12	5	1	6	9	2	10	10	1	2	6	3	3	2	3	5	4	1	3	1	1	