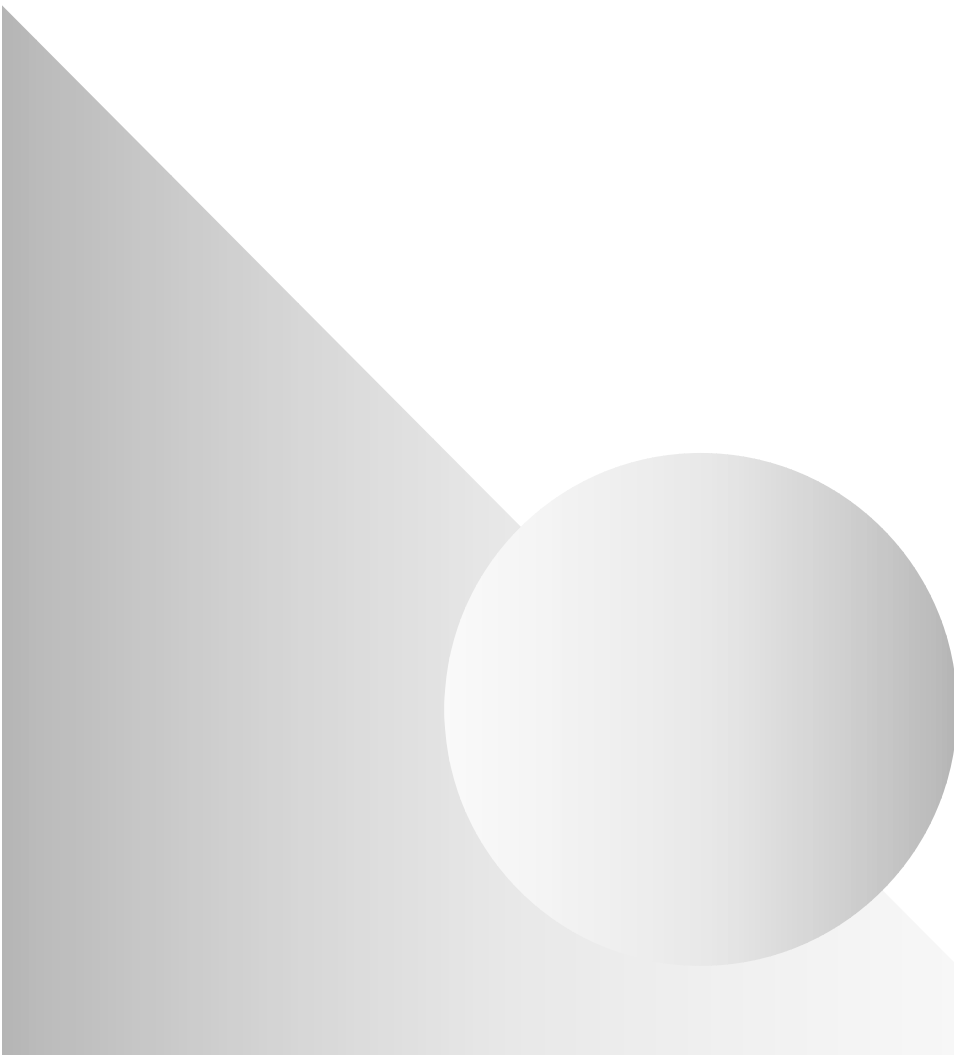


1993 Annual Report

Biological and Chemical Defence Review Committee



The Committee

Clive E. Holloway (Chairman)
Raymond G. Marusyk
Gabriel L. Plaa

TABLE OF CONTENTS

| | Page |
|---|------|
| Summary | 1 |
| Introduction | 2 |
| Committee Activities — 1993 | 2 |
| Implementation of Barton Report Recommendations | 3 |
| Implementation of BCDRC 1990 Report Recommendations | 4 |
| Implementation of BCDRC 1991 Report Recommendations | 5 |
| Implementation of BCDRC 1992 Report Recommendations | 5 |
| Some Important Issues | 6 |
| Impressions of Personnel and Programs | 7 |
| Some Concerns | 7 |
| Conclusions | 8 |
| Recommendations | 8 |
| Annexes: | |
| A Biographies of Committee Members | |
| B References for Previous Reports | |
| C Committee Responsibilities | |

SUMMARY

This report records the 1993 activities of the Biological and Chemical Defence Review Committee (BCDRC). It also indicates the current state of the implementation of the recommendations made in the 1988 Barton Report and the reaction to the recommendations contained in the three previous Committee reports.

We have concluded that there are neither indications of duplicity within Canada's biological and chemical defence program nor evidence to support the contention that offense-related activities are being conducted either on behalf of Canadian authorities or to comply with any multilateral treaty commitment.

We are of the opinion that Canada should retain the capability to conduct a moderate program of defensive research and development to permit military operations under the threat of biological and chemical weapons.

The Committee recommends that:

I. The Annual Agent Inventories Audit Reports be restructured as follows:

- a. biological agents used for research purposes are to be identified by complete strain or antigenic designator;
- b. stocks of biological agents are to be quantified in meaningful terms; ie, infectious titres or colony-forming units per given volume; and
- c. stocks of biological agents that are clearly not agents of biological warfare should be identified as such with an accompanying statement to the effect that such agents may be found in Public Health, University and Industrial laboratories.

II. The Department of National Defence (DND) apprise External Affairs and International Trade Canada (EAITC) of the widespread concern over Canada's perceived lack of interest and international scientific involvement in the verification issue.

III. EAITC be requested to present annually to the BCDRC a review of the activities undertaken by Canada to comply with the arms control obligations accepted under the Biological and Toxin Weapons and the Chemical Weapons Conventions.

IV. DND establish and publicize a means whereby access by special interest group representatives to the contents of international agreements is provided.

INTRODUCTION

The policy of the government of Canada is to press for global, comprehensive and verifiable treaties to ban all biological and chemical weapons. However, while the threat from such weapons endures, Canada has an obligation to ensure that members of the Canadian Forces (CF) have adequate training and equipment to protect themselves against exposure to chemical and biological agents.

On the other hand, the Canadian public has the right to be assured that Canada's policy of maintaining only a defensive capability in this field is fully respected at all times, and that any research, development and training activities undertaken by this country are professionally conducted and pose no threat to public safety or the environment.

To facilitate this assurance, the Biological and Chemical Defence Review Committee (BCDRC) was established by the Minister of National Defence in 1990. The Committee is mandated to review annually the research, development and training activities in chemical and biological defence undertaken by the Department of National Defence (DND) to ensure that they are defensive in nature and conducted in a professional manner with no threat to public safety or the environment. (BCDRC Responsibilities are in Annex C).

The Committee members' appointments are approved by the Deputy Minister of National Defence and the Chief of the Defence Staff on the recommendation of the Chairman of the Defence Science Advisory Board (DSAB). Nominations for BCDRC membership are solicited by the Chairman DSAB from the Royal Society of Canada, the Canadian Federation of Biological Societies, the Canadian Society of Micro-biologists, the Chemical Institute of Canada and the Society of Toxicology of Canada.

The present members are:

| | | |
|----------|----------------------|------------------------|
| Chairman | Dr Clive E Holloway | York University |
| Member | Dr Raymond G Marusyk | University of Alberta |
| Member | Dr Gabriel L Plaa | University of Montreal |

Reports have been submitted in the Autumn of each year since 1990. Notwithstanding firm and iterative Committee recommendations to make these Reports available to the public, to date only the 1990 Report has been released.

COMMITTEE ACTIVITIES — 1993

To effect our mandate in this the fourth year of our review process, Dr Holloway attended the Canadian Forces' Nuclear, Biological and Chemical Senior Officers' Course in October 1992, Dr Plaa attended the DND Annual Nuclear, Biological and Chemical Defence Conference in September 1993 and we visited, between 09 May and 04 June 1993, the below listed DND Establishments, including the associated laboratories, ranges and training facilities:

- National Defence Headquarters with staff briefings from:
 - Chief Research and Development (CRAD)
 - Deputy Chief of the Defence Staff
 - Surgeon General
- Headquarters Land Forces Western Area, Canadian Forces Base Edmonton and 435 Transport Squadron with briefings from each on the biological and chemical training being conducted and facilities available
- Canadian Forces Nuclear, Biological and Chemical (CFNBC) School with briefings on its responsibilities, resources and training
- Defence Research Establishment Ottawa (DREO) with briefing on the Protective Sciences Division and the Chemical and Environmental Protection Sections including current and future programs
- Defence Research Establishment Suffield (DRES) with briefings on the responsibilities and resources of DRES, the Defence Technologies Division, Defence Sciences Division (DSD), the Chemical/Biological Defence Section, the Biomedical Defence Section and Project SWIFTSURE including current and future programs

The Committee also visited the Canadian Bureau of Biologics, Ottawa.

Reports were presented to the Committee by representatives from eight Canadian non-governmental institutions/companies who have biological or chemical research and/or developmental (R&D) contracts with DREO or DRES.

While at DRES, the BCDRC held privileged discussions with representatives of the DSD Joint Occupational Safety and Health Committee, the three involved Unions and the Animal Care Committee. Further, time was made available at DRES to allow any member or groups of members to approach us to discuss matters of concern. These activities provided helpful insights into the program and morale at Suffield. Although the Committee was similarly available during the visit to DREO, no members came forward.

To enhance our perspective of the concerns of Canadians in Canada's biological and chemical defence activities, an afternoon meeting was held in Calgary with the President of The Canadian Physicians for Prevention of Nuclear War and an evening was spent at the University of Toronto with representatives of the Science for Peace Group.

As mandated, the BCDRC reviewed DND's 1993 Biological and Chemical Defence Research and Development Program and determined that it was indeed in accordance with current Canadian Government Policy. In addition, the latest editions of the DREO and DRES Annual Reports were reviewed and their current R&D contracts and publications lists scrutinized.

IMPLEMENTATION OF BARTON REPORT

RECOMMENDATIONS

The implementation of the recommendations contained in the Barton Report was examined in detail. The current status of each recommendation was ascertained to be:

GENERAL

- 1. In the course of the annual program and budgetary process, the authorizing officer at each level be required to sign a certificate of compliance with Departmental policies.**

Certificates of Compliance for 1993/1994 were reviewed and found to be in order.

- 2. A senior Review Committee be established in association with DSAB.**

We constitute such a Committee.

- 3. "Second opinions" should be obtained from outside sources on some of the potentially controversial test programs.**

The BCDRC considers that the most effective way to obtain credible second opinions would be to exploit the methodology developed for Project SWIFTSURE, in particular the use of outside committees. Some of these, especially those established to discuss research policy, might collaborate through the medium of workshop type conferences from which "second opinions" would most surely evolve. When selecting external committees, stress should be placed on geographic breadth and scientific competence of designated personnel. Nominations should be made by impartial third parties such as scientific, engineering or other scholarly societies.

- 4. A document be prepared annually which would set out the nature of the research and development work under way, the number of people involved, and allocated funding.**

The 1990/91 Review was published in February 1992. The 1991/92 and the 1992/93 Reviews are expected to be published in early 1994.

- 5. A layman's pamphlet be published which would help improve public understanding about Biological and Chemical Defence.**

An appropriate Departmental pamphlet was published in August 1990. A similar pamphlet, emphasizing the work at DRES, was published in April 1993.

- 6. A DND directive on policies and procedures regarding the use of volunteers and animals be published.**

DND Policy - Animal Use in R&D was issued on 15 June 1989.

Canadian Forces Administrative Order 34-54, Use of Volunteers as Human Subjects in Research, should be promulgated by March 1994.

DRES

- 1. A procedure be established to ensure that the DRES Safety Manual is reviewed at prescribed regular intervals of not more than three years. Safety drills should also be conducted at prescribed regular intervals.**

The procedure has been established and implemented. Safety drills are being conducted as recommended. A new safety plan is currently being generated to comply with the recommendations of the 1992 environmental audit.

- 2. An automatic annual review and certification procedure be instituted to confirm that stocks of toxic agents are being kept to the minimum level necessary for the conduct of an efficient research and development program.**

The annual inventory audit was completed in January 1993 and reviewed by the BCDRC in May 1993. We agreed that stocks were being properly maintained at a minimum level which in most cases is only a fraction of levels authorized.

- 3. The arrangements being implemented to improve security and access controls be expedited.**

Completed.

- 4. Pending the destruction of the excess agent stocks now stored in the Experimental Proving Ground, the adequacy of existing physical security arrangements be reviewed with a view to strengthening them.**

Completed.

- 5. The incinerator which is to be acquired for the program be considered for use in the destruction of other dangerous industrial chemicals, including PCBs.**

As the Alberta Provincial Government legislated this recommendation unimplementable, the incinerator was sold and its removal from DRES was completed on 6 August 1992.

- 6. The Experimental Proving Ground (EPG) operation and maintenance be given "project" status within the CRAD program.**

Implemented. This gives positive visibility to all activities, funding and personnel involved in the EPG and ensures an annual review as a separate program component.

7. The scope of the safety and environmental requirements governing outdoor testing at DRES be determined by the provisions of the Canadian Environmental Protection Act.

Although the Act at present does not include such express provisions, the Federal Minister of Environment has stated that his department will develop the requisite guidelines as and when necessary. In addition, a staff control system is in place and functioning to ensure compliance with all constraints.

8. A full environmental audit of DRES be commissioned as soon as possible and that it be repeated at regular intervals of, say, five years.

Acres Consultants Ltd, having completed the audit under a Supply and Services Canada contract, submitted their final report in February 1992. An internal staff agency has been situated to initiate recommendation compliance. All the Report's recommendations have been addressed and full compliance is anticipated. The Acres' report has been deposited with the Canada Institute for Scientific and Technical Information (CISTI), the National Library and major university libraries throughout the country. The BCDRC will review progress annually.

DREO

1. A regular annual review procedure be instituted at DREO to confirm for the record that stocks of chemical agents are kept to the minimum necessary for the research and development program.

The annual inventory audit was completed in January 1993 and reviewed by the BCDRC in June 1993. Stocks that are no longer required have been destroyed, those remaining are being properly maintained at an absolute minimum level. It is anticipated that the entire chemical agent inventory will be destroyed by the end of 1993.

2. As part of the implementation of the Canadian Environmental Protection Act, an environmental audit of DREO be carried out at the first convenient opportunity, and at regular intervals (say five years) thereafter.

Having completed the audit under a Supply and Services Canada contract, Acres Consultants Ltd submitted their final report in November 1991. All the Report's recommendations have been addressed and full compliance by the realistic completion date of June 1994 is envisioned. This report is widely available as noted above (under DRES). The BCDRC will continue to monitor.

IMPLEMENTATION OF BCDRC 1990 REPORT RECOMMENDATIONS

1. The flow of information within the Defence Research Laboratories between sections, management and staff

might be improved — possibly through occasional informal meetings and discussions with senior managers.

There is marked improvement in the awareness levels throughout the system, particularly at DRES. Monitoring will continue.

2. Career management procedures should be more closely attuned to the needs of small but extremely important units such as the CFNBC School.

An improved personnel rotation plan which caters to enhanced continuity appears to have been adopted.

3. A higher than present percentage of the CFNBC School staff should have scientific or engineering backgrounds.

Although a scientifically educated officer has recently been appointed to the School, we still consider that the number of instructors with adequate backgrounds is insufficient.

4. Restricted agent training should continue to be conducted annually at DRES for selected military personnel.

The intended level of compliance with this recommendation has been achieved. Its continuation will be monitored.

5. CRAD should attempt to increase the number and scope of articles on biological and chemical related research for publication in open literature.

This concern has been satisfactorily addressed, particularly by DRES. Monitoring will continue.

6. CRAD should establish an accountability system to reflect:

- a. **all current biological and chemical research activities, both in-house and on contract, including budgets;**
- b. **the publications and resultant presentations directly attributable to each activity or sub-activity; and**
- c. **notes explaining why specific activities have not been publicized.**

An excellent accountability reporting system has been implemented. The BCDRC will review the classified paragraphs during their annual visit to the applicable responsibility centre. Monitoring of the resultant annual report will continue.

7. An enhanced public relations program should be initiated to emphasize the many excellent achievements of the research laboratories. Perhaps the Fiftieth Anniversary of DRES could be used to initiate regular open house events, occasional visitations by citizen groups or non-governmental scientific organizations and invitations to learned societies to hold chapter meetings at DRES.

A noticeably improved program is in place. To reinforce this endeavour, we advocate that every plausible local special

occasion be exploited, as was done during the various Fiftieth Anniversary celebrations, and that community involvement become the norm whenever possible. In addition, the outstanding historical display of the evolution of biological and chemical defence efforts by Canada, which has been created by DRES, should be exploited to the maximum nationwide.

IMPLEMENTATION OF BCDRC 1991 REPORT RECOMMENDATIONS

1. Canada continue to develop and refine verification, compliance monitoring and investigatory techniques.

EAITC is primarily responsible for this activity and will be apprised of the BCDRC concerns.

2. Consideration be given to the co-location of DRES and the CFNBC School.

Although the technical advantages to accrue from such a move are recognized, financial constraints preclude its immediate implementation. The Committee will review this matter again.

3. BCDRC Annual Reports should be submitted to the Ad Hoc Committee on Chemical Weapons of the Conference on Disarmament in Geneva.

As this Committee no longer exists, it is suggested that the Reports be offered to the Review Committee of the Biological and Toxin Weapons Convention and to the Organization for the Prohibition of Chemical Weapons. However, as the formal adoption of this recommendation is the purview of EAITC, DND has agreed to convey the request.

4. The BCDRC be offered annually a vacancy on the Nuclear, Biological and Chemical Senior Officers' Course conducted by the CFNBC School.

Agreed. Dr CE Holloway attended the Course in 1992.

5. The Canadian Forces Medical Services should hold reasonable amounts of appropriate medical supplies to treat possible future biological and chemical casualties on little or no notice.

The Surgeon General has initiated a medical stockpiling priority acquisition program designed to meet identified requirements.

6. Canada continue to function internationally in the biological and chemical fields in accordance with current government policy.

Agreed. Full compliance is anticipated.

7. Every reasonable measure possible should be taken to intensify the visibility of all biological and chemical defence research and development conducted in Canada.

The Departmental Communications' Policy currently in place should provide the necessary impetus. We are favourably impressed by the steps taken so far by the individual research establishments.

8. A bacteriologist or microbiologist (whose specialty is infectious diseases) be appointed to the BCDRC at the earliest opportunity.

Dr RG Marusyk was appointed to the BCDRC in May 1993.

IMPLEMENTATION OF BCDRC 1992 REPORT RECOMMENDATIONS

1. Priority of effort be given to fundamental biochemical research which could also have applications outside the defence sphere.

Agreed. However, the primary basis of the research must concern defence but any useful spinoffs will be shared.

2. An information exchange system be instituted to ensure that applicable CRAD directed research results are readily available to civilian industry.

Agreed. This will be accomplished by increasing the distribution of CRAD Reports to interested industries, by making the Directorate of Scientific Information Services (DSIS) Data Base readily available to non-governmental agencies, by exploiting the Supply and Services Canada (SSC) electronic information system and by DND becoming more pro-active in product development.

3. The involvement of CRAD scientists in disarmament sessions in Geneva continue and not fall victim to current fiscal restraints.

This international involvement will continue as a priority activity within the DND funding envelope.

4. A program designed to train selected military personnel to conduct biological and chemical inspections and to effect environmentally safe demolitions be implemented.

This requirement will be met on an established need-for-need basis.

5. CRAD invite, through learned societies, a number of knowledgeable outside scientists to a workshop to discuss a biological defence research strategy for Canada for the next decade.

Consideration is being given to instituting advisory committees by discipline. However, a solution to the problem of constraints imposed by international agreements will have to be found if full utility is to be achieved.

6. DND increase its involvement in the inter-departmental activities concerning domestic coordinated reaction to terrorist use of biological and chemical weapons.

Agreed. The requisite action has been taken to meet the intent of this recommendation.

7. An invitation be extended to at least one member of the BCDRC to attend the annual DND NBC Conference.

Approved. Dr GL Plaa attended in 1993.

8. A higher percentage of CFNBC School staff should have scientific backgrounds.

Notwithstanding progress made to date, we consider this issue to be of sufficient concern to warrant continued monitoring.

9. Further consideration be given to the co-location of DRES and the CFNBC School.

Although the technical advantages to accrue from such a move are recognized, financial constraints preclude its implementation. The Committee will continue to review this issue.

SOME IMPORTANT ISSUES

Concerned Citizens Groups

The BCDRC met with representatives of the Calgary Branch of Canadian Physicians for Prevention of Nuclear War (who have expanded their mandate to encompass a wider range of health concerns) and the Toronto Chapter of Science for Peace. Written and oral submissions were received. The primary concerns of these citizen groups warrant comment. Based on our research and discussions with Departmental personnel, we offer the following:

- a. **Concern:** There continues to be a lack of legislation in Canada pertaining to offensive biological and chemical weapons development.

Comment: We agree, for Canada to comply with the Biological and Toxin Weapons Convention and the Chemical Weapons Convention, some legally constraining regulations and the identification of a national authority to oversee internal implementation will be essential.

- b. **Concern:** The conduct of recombinant DNA technology at DRES.

Comment: The objective of all DRES sponsored recombinant DNA technology is threefold. Firstly, to develop suitable methods for protection against or treatment of infections from potential biological agents and toxins; secondly, to develop rapid and sensitive methods for the detection and identification of potential biological agents and toxins; and thirdly, as these are of significant usefulness in general medicine, to share findings with other medical researchers.

- c. **Concern:** How do interested persons differentiate confidently between offensive and defensive research.

Comment: The line between offensive and defensive biological and chemical research is a fine one. Experimentation with lethal substances for the testing of defensive devices understandably arouses suspicions that results are being or could be diverted to offensive purposes. Our own method of inspection and monitoring has assured us that at DRES the budget is insufficient, the facilities inadequate and the production and field trial personnel lacking to permit production and packaging of toxins for purposes of warfare. Further, for such research to be of value the CF would need to devote some training and instructional effort to offensive operations. Based on our visits to a reasonably broad spectrum of CF units and training establishments and attendance at the Annual DND NBC Conference, we are able to unequivocally confirm that the CF are focused on defensive operations only.

However, it is widely acknowledged that terrorist groups could produce many lethal substances in fearsome amounts in bathtubs or other similar unprotected areas so, essentially, a final verdict depends on openness and trust. DRES has been particularly open in its dealings with the press and public in the past few years and has allowed our Committee to scrutinize classified projects and international agreements. We have established a state of mutual trust with the DRES scientists and other personnel and are convinced that they believe that the research being conducted there is wholly directed towards defence.

- d. **Concern:** Allegations of possible commitment to other Nations' biological and chemical research programs were made on the basis of Canada being a signatory to certain treaties and memoranda of understanding (MOU) which were classified and hence not readily available for perusal.

Comment: The applicable treaties and MOUs were examined in detail. No evidence of such a commitment was found nor was there any indication that Canada could be coerced into R&D activities contrary to approved National policies.

- e. **Concern:** If Canada's MOUs and Agreements on BCD are relatively innocuous, as maintained by the BCDRC, why are they not published in accordance with Article 102 of the Charter of the United Nations.

Comment: We are given to understand that these MOUs are classified at the request of one or more of the other signatories and cannot be made public. However, DND will undertake to advise EAITC, the responsible Department, of this issue.

- f. **Concern:** The construction of a "Level 4" containment facility at DRES.

Comment: The upgrading of the existing containment facility to conform with current Health and Welfare Canada

standards for “Level 3” is underway. There is neither intention nor requirement at present to build a “Level 4” facility.

It should be noted that the real constraint on very sensitive research is not the facility level available but it is the level of risk to their own safety that those involved are prepared to accept.

- g. **Concern:** Given that the Canadian public has the right to be assured that Canada’s policy of maintaining only a defensive biological and chemical capability is fully respected, and that research, development and training activities undertaken by DND are professionally conducted and pose no threat to public safety or the environment, DND should publish the BCDRC’s annual reports in a timely fashion.

Comment: The Committee has recommended the publication of their Reports and DND has so agreed. The inordinate delay in compliance, which is perceived as undermining the credibility of the process and as counterproductive to answering the Barton Report concerns, remains unexplained.

- h. **Concern:** Canada should not only continue to participate in international efforts both to develop and to improve verification methods and technologies but also should increase the current activity level in this field.

Comment: The Committee fully supports this initiative. Although the responsibility for verification rests with EAITC, the scientific expertise resides in DND. We are convinced that the current hands off policy will lead to the international isolation of DND research scientists in this field and Canada’s leadership in related international fora will suffer severe degradation. DND should again raise this concern with EAITC.

- i. **Concern:** In the interests of assuring the public that Canada is in compliance with its arms control obligations under the Biological and Toxin Weapons and the Chemical Weapons Conventions, the BCDRC Mandate should be expanded to include the verification of these commitments.

Comment: As this suggestion requires the consent of more than one Government Department, it will be submitted by the BCDRC as a recommendation for interdepartmental consideration.

- j. **Concern:** Notwithstanding the best of intentions of defence researchers, the question has been raised as to whether the potential for developing civilian applications through the militarization of biology research is sufficient to overcome the inherent risks.

Comment: This concern, particularly when associated with the implied issue of scientific ethics related to the recognized risk of producing novel pathogenic organisms raises a serious dilemma for DND. However, DND is obliged to ensure that members of the CF have adequate training and equipment to protect themselves against exposure to chemical and biological agents. At present, the most effective method identi-

fied to meet this obligation is the one currently being exploited.

IMPRESSIONS OF PERSONNEL AND PROGRAMS

We would once again like to express our appreciation for the candidness and cooperation given to us throughout our 1993 visits’ schedule.

Within DND’s biological and chemical defence research and development program the quality of science, the projects underway, the resultant publications and the level of safety awareness continue to be of a high standard. The potential of commercial uses of the results of the work at DRES, particularly in the fields of public health, medical science, geriatrics and agriculture, should be made more widely known to the public.

SOME CONCERNS

- The reduction in personnel through attrition to meet new staffing levels is causing a disparate impact in some talent groupings at individual Establishments. This occurrence plus the impact of the current CRAD consolidation/co-location program demand that significant management attention be paid to ensure that safety and morale continue to be paramount considerations.
- Some of the CFNBC School’s course material, particularly that relating to biological aspects, lacks currency. Extensive revision is required.
- Although statements describing all existing contracts with outside agencies are open to our review, the continuation of an annual briefing of the BCDRC by a cross-section of selected contractors is deemed to be necessary. These briefings provide us with both valuable insights into the perceived activity objectives and strengthen our confidence in the intent of the total program.
- The measures taken over the past three years to enhance public awareness and trust in Canada’s biological and chemical defence program have been very successful. However, doubts and suspicions do still arise particularly regarding Canada’s commitments based on classified international agreements. These can only be confidently allayed if openness and consultation are applied to potentially controversial programs and if access to the contents of international accords is granted to representatives of special interest groups.
- Middle East events, the current political upheaval in Eastern Europe, and Canada’s involvement in peace restoration and peacekeeping operations in the lesser developed areas of the world all suggest that a discreet research and development program aimed at maintaining state-of-art detection, protection and verification devices should continue. In addition, initial and annual refresher training designed to comply with NDHQ Instruction DCDS 15/93 of 21 July 1993 should be carried out by all uniformed members of DND.

CONCLUSIONS

- The BCDRC found neither indications of duplicity within DND's biological and chemical program nor evidence to support the contention that offense-related activities were being conducted either on behalf of Canadian authorities or to comply with any multilateral treaty commitment.
- We remain convinced that Canada must retain a modest capability to effect defensive research and development to permit military operations under the threat of biological and chemical attack. We believe that the priority of effort should be accorded to the following projects, which in addition to their obvious military relevance also contribute to treaty monitoring, medical support, pollution control and the handling of toxic wastes:
 - a. verification technology;
 - b. agent detection and identification;
 - c. prophylaxis and therapy for biological agents;
 - d. development of less physiologically burdening individual protective clothing with wider geographical and employment specific pertinence;
 - e. refinement of procedures to foresee and assess hazards posed by both established and hypothetical chemical and biological agents; and
 - f. improved decontaminants.
- To comply with the intent of the Biological and Toxin Weapons Convention, Canada should consider enacting supporting legislation to meet or exceed that enacted by some of the other signatories.

RECOMMENDATIONS

- I. The Annual Agent Inventories Audit Reports be restructured as follows:
 - a. biological agents used for research purposes are to be identified by complete strain or antigenic designator;
 - b. stocks of biological agents are to be quantified in meaningful terms; ie, infectious titres or colony-forming units per given volume; and
 - c. stocks of biological agents that are clearly not agents of biological warfare should be identified as such with an accompanying statement to the effect that such agents may be found in Public Health, University and Industrial laboratories.
- II. DND apprise EAITC of the widespread concern over Canada's perceived lack of interest and international scientific involvement in the verification issue.
- III. EAITC be requested to present annually to the BCDRC a review of the activities undertaken by Canada to comply with the arms control obligations accepted under the Biological and Toxin Weapons and the Chemical Weapons Conventions.

IV. DND establish and publicize a means whereby access by special interest group representatives to the contents of international agreements is provided.

ANNEX A

BIOGRAPHIES OF COMMITTEE MEMBERS

Dr. Clive E. Holloway (Chairman)

A graduate in chemistry from the Bristol College of Advanced Technology and the University of Western Ontario; he is currently a Professor of Chemistry and Director of Natural Science at York University, and is actively involved on the executive committees of the Chemical Institute of Canada and the Association of the Chemical Profession of Ontario.

Dr. Raymond G. Marusyk

A graduate in virology from the University of Alberta and the Karolinska Institute in Stockholm; he is the Professor of Virology in the Department of Medical Microbiology and Infectious Diseases at the University of Alberta and is the Associate Director of the Provincial Laboratory for Public Health. He is First Vice-President of the Canadian Society of Microbiologists and is a consultant with the World Health Organization.

Dr. Gabriel L. Plaa

A graduate in toxicology from the University of California in San Francisco, he is a Professor in the Department of Pharmacology in the Faculty of Medicine and the Director of the Interuniversity Centre for Research in Toxicology at the University of Montreal. Among his many appointments and affiliations, he is a member of the Society of Toxicology of Canada and the American Board of Toxicology.

ANNEX B

REFERENCES FOR PREVIOUS REPORTS

1. Research Development and Training in Chemical and Biological Defence within the Department of National Defence and the Canadian Forces: A Review by William H. Barton, Minister of Supply and Services Canada, 1989, p.54. [Available in Canada through the Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Ontario K1A 0S9. Catalogue No. D2-79/1989E, ISBN 0-660-13103-X.]
2. First Annual Report of the Biological and Chemical Defence Review Committee, Minister of National Defence, Ottawa, 1991, p.7. It is also included in the second annual Review of the Chemical and Biological Defence Program January 1990 - April 1991, Minister of National Defence, Ottawa, February 1992, p.28. [Both available through the National Defence Headquarters Library Services, National Defence Headquarters, MGen GR Pearkes Building, Ottawa, Ontario K1A 0K2.]

ANNEX C

BIOLOGICAL AND CHEMICAL DEFENCE REVIEW COMMITTEE

RESPONSIBILITIES

GENERAL

1. The Biological and Chemical Defence Review Committee (BCDRC) is to review annually the research, development and training programs in biological and chemical defence undertaken by the Department of National Defence (DND) to ensure that all activities within those programs are, in fact, defensive in nature and are conducted in a professional manner with no threat to public safety or the environment.

EXECUTION

2. The BCDRC will annually:
 - a. visit:
 - (1) the Defence Research Establishment Ottawa (DREO);
 - (2) the Defence Research Establishment Suffield (DRES);
 - (3) the Canadian Forces Nuclear, Biological and Chemical (CFNBC) School; and
 - (4) at least two other DND Establishments where biological and chemical training is conducted.

- b. review the annual DND Research and Development Program as originated by the Chief of Research and Development (CRAD) and approved by the Defence Management Committee;
- c. review the implementation of the recommendations made in:
 - (1) the BARTON REPORT of 31 December 1988;
 - (2) the 1991 and 1992 Independent Environmental Audits of DREO and DRES; and
 - (3) the previous BCDRC Reports;
- d. examine the Annual Reports, activities and records of the Human Ethics and Animal Care Committees and current research and development contracts and publications lists of DREO and DRES; and
- e. submit a report of their activities and findings to the Chairman, Defence Science Advisory Board (DSAB) who will convey the Report to the Chief of the Defence Staff and the Deputy Minister of National Defence.

COORDINATION

3. The Committee, consisting of a chairperson and two members representing the disciplines of bacteriology/microbiology, chemistry and toxicology, is to be appointed for terms of two or three years by DND on the recommendation of the Chairman, DSAB.
4. The DSAB will provide the requisite organizational support and will assign an executive officer to the Committee who will attend to all procedural, reporting, coordination and administrative matters as directed by the Committee.