
2020 ANNUAL REPORT

Biological and
Chemical Defence
Review Committee

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Biological and Chemical Defence Review Committee

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BIOLOGICAL AND CHEMICAL DEFENCE
REVIEW COMMITTEE**

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INTRODUCTION

The policy of the Government of Canada is to press for global, comprehensive, and verifiable treaties banning all biological and chemical weapons. To this end, Canada is a State Party to the Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons and on their Destruction (the Biological and Toxin Weapons Convention or BTWC) and, to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (the Chemical Weapons Convention or CWC).

However, for as long as the threat from such weapons endures, be they in the hands of state, or potentially, non-state actors, the Government has a recognized obligation to ensure that members of the Canadian Armed Forces (CAF) are adequately equipped and trained to protect themselves from exposure to biological and chemical warfare (BCW) agents. Such protection is required not only during operational deployments abroad, but also in the context of military support to responses to terrorist incidents at home or other domestic emergencies involving these agents.

This said, the Canadian public, as well as the international community, have the right to be assured that the Government's policy of maintaining only a defensive capability in this field is fully respected and that any related research, development, or training activities undertaken are conducted in a professional manner with minimal risk to public safety or the environment.

To facilitate this assurance, the Minister of National Defence, in May 1990, directed the establishment of the Biological and Chemical Defence Review Committee (BCDRC or, "the Committee") as an adjunct to the Defence Science Advisory Board. Today, the BCDRC operates at arm's length from Government. Its mandate is to provide an independent, third-party review of the Biological and Chemical Defence (BCD) research, development and training activities undertaken by the Department of National Defence (DND) and the CAF with a view to assessing whether they are defensive in nature and conducted in a professional manner with minimal risk to public safety or the environment.

The BCDRC normally comprises three experts in scientific disciplines relevant to BCD such as chemistry, microbiology, and toxicology. One of these is selected by the Committee to serve as Chair. New members are appointed by the Chair based on nominations from such professional societies and associations as the Royal Society of Canada, the Canadian Society of Microbiologists, the Chemical Institute of Canada, and the Society of Toxicology of Canada. The Chair also arranges for an administrative staff member to function as the Committee's Executive Officer.

Committee membership, as of 1 April 2020, was as follows:

Dr. Heather Durham (Committee Chair)
Professor of Neurology and Neurosurgery
Montreal Neurological Institute and Hospital
McGill University

Dr. Heinz-Bernhard Kraatz
Professor of Chemistry
University of Toronto

Dr. Jonathan Van Hamme
Professor of Microbiology
Thompson Rivers University

Brigadier-General (Ret'd) James Selbie serves as Executive Officer to the Committee.

The Committee's annual cycle of activity includes:

- Briefings in Ottawa from representatives from National Defence Headquarters (NDHQ) and Global Affairs Canada (GAC) on BCD issues
- Visits to selected CAF education and training establishments, operational formations, and units where BCD activity takes place, and to associated government (mostly DND) research and development facilities such as the Defence Research and Development Canada (DRDC) research centre at Suffield, Alberta (which is visited every year)
- Attendance at selected BCD exercises, training courses, workshops, seminars, symposia, *etc.*, conducted by the CAF or DND
- Publication of an Annual Report in the public domain with key observations, findings, and recommendations

The Committee's Annual Reports, dating back to 1991, are available on its website (www.bcdrc.ca). No report was produced in 2010 due to a delay in renewing the Committee's mandate.

The work of the Committee is funded by a contribution from the Government of Canada Department of National Defence.

SUMMARY

Having detected no evidence to the contrary during its 2020 briefing and visit programme, the Committee concludes that:

- Canada's policy of maintaining a purely defensive biological and chemical warfare capability is fully respected by the DND and the CAF.
- The BCD research, development and training activities undertaken by the DND and the CAF are compliant with Canada's obligations as a State Party to the BTWC and to the CWC.
- The BCD research, development and training activities undertaken by the DND and the CAF, as observed by the Committee, pose minimal risk to public safety or the environment.
- There is no coyness or duplicity within the BCD program.
- In addition to its principal conclusions, the Committee, drawing upon its observations made during its visits to DND and CAF education and training establishments, operational formations, units and research and development facilities, offers one new recommendation aimed at reinforcing the good management and effectiveness of Canada's BCD program.

COMMITTEE ACTIVITIES 2020

Due to the impact of the COVID-19 pandemic, the Committee was forced to cancel its programme of in-person visits scheduled for the spring and summer. When it became apparent that public health measures would severely impede travel for the foreseeable future, arrangements were made to substitute for physical meetings, a series of video-conferences (VTC) with the staff of those establishments contact with which is considered essential to the discharge of our mandate. The one exception was our meeting with the Directorate of Scientific and Technical Intelligence which was conducted in person for reasons of information security.

Three activities were cancelled outright: visits to the RCAF's 1 Canadian Air Division Headquarters and DRDC's Valcartier Research Centre, and observation of the NATO live agent training exercise at Suffield (Exercise PRECISE RESPONSE). Conditions permitting, we will include these in our 2021 programme.

This said, during 2020, the Committee conducted the following activities:

- **DRDC Suffield Research Centre (SRC) (08-10 September).** VTCs incorporating the following presentations and discussions:
 - an overview presentation by the Centre Director and discussion of SRC's role, mission, and tasks; organization; infrastructure; resource allocation; staffing, notable activities and initiatives undertaken over the past year; inter-departmental and international involvements; and other issues of note
 - an overview presentation and discussion of the current BCD research and development program and associated projects underway at SRC
 - a presentation and discussion of the BCD training program and other activities at the Counter Terrorism Technology Centre
 - a review of all BCD research and development contracts awarded to outside agencies
 - briefings by selected contractors engaged in BCD research or development or the Technical Authorities overseeing these contracts
 - presentations by, and subsequent discussions with the Heads of the Bio-Threat Defence Section, the Chemical and Biological Assessment and Protection Section and, the Casualty Management Section on current work and issues
 - review and discussion of microbiological, viral and toxin holdings, including management protocols and procedures
 - review and discussion of chemical holdings, including management protocols and procedures and compliance with the Controlled Drugs and Substances Act and its attendant regulations
 - a review and discussion of any transfers from SRC of chemical agents or pathogenic biological materials during the period 1 May 19 – 30 Apr 20 and, procedures for the control and tracking of their use by the receiving agency
 - an update on the application of the DRDC Chemical, Biological, Radiological and Nuclear (CBRN) Risk Management Framework at SRC
 - an update of the integration of the existing Health and Safety and Environmental Management Systems with DRDC's Corporate Safety and Environmental System
 - review and discussion of the current safety program and related issues including:
 - a summary of any biological or chemical hazardous occurrences or "near misses" over the past year and the action taken in response to same

- status of the implementation of the recommendations in the 2016 and 2017 Fire Marshal's reports
- status of the issue of storage and disposal of ventilation filters from the fume hoods in Building 1
- a private meeting with the General Safety Officer and the Chairs of the Biosafety Committee and the Chemical Safety Committee
- review and discussion of the current infrastructure development program and other notable corporate services issues
- review and discussion of the current environmental stewardship program including a private meeting with the Acting Environmental Officer
- review and discussion of the current physical and information security program
- a meeting with the CFB Suffield Medical Officer to update the Committee's understanding of the readiness of the CFB Suffield Medical Section to respond to incidents involving biological or chemical agent
- a meeting with the Base Commander
- an opportunity for any staff member to communicate with the Committee in private and in confidence
- review and discussion of recent local developments in connection with relevant open recommendations contained in the BCDRC's 2019 Annual Report
- at the conclusion of the visit, a Committee debriefing of the Centre Director and his executive management team on its initial observations and conclusions
- **DRDC Centre for Security Science (5 October).** A VTC during which the Committee received an update on the status of the biological and chemical portfolio of projects in the Canadian Safety and Security Program (CSSP) as well as other Centre activities.
- **Canadian Joint Immediate Response Unit – CBRN (6 October).** A VTC during which the Committee was updated on the unit's role, mission, and tasks; employment concept; capability development intentions; and training safety and environmental protection policy and procedures. The Committee was also briefed on a broad range of existing controls and current issues pertaining to the provision of medical support to the unit's operation.

- **Directorate of Scientific and Technical Intelligence – NDHQ Ottawa (7 October).** An in-person meeting during which Committee representatives, Dr. Kraatz and Brig.-Gen. (Ret'd) Selbie, were briefed on the current biological and chemical warfare agent threat assessment.
- **Assistant Deputy Minister Policy – NDHQ Ottawa (7 October).** With the assistance of GAC representatives, the Committee was updated during a VTC on changes to the strategic security environment as well as the status of the CWC and BTWC, including an update on compliance by the DND and the CAF. The Committee was also briefed on recent biological and chemical weapons counter-proliferation support and other activities conducted under the auspices of the GAC-led Weapons Threat Reduction Program.
- **Directorate of Joint CBRN Defence (D JCBRN D) – NDHQ Ottawa (7 October).** In a VTC, the Director of JCBRN D updated the Committee on the role and organization of the Directorate; the status of the BCD equipment procurement projects; research and development calls for proposals; the evolution of policy and doctrine; Exercise PRECISE RESPONSE; and international engagement activities.
- **Canadian Forces Health Services Group Headquarters (CFHS Group HQ) – Ottawa (8 October).** In a VTC, the Committee met the new Surgeon General and was briefed by staff of the Operational Medicine Section on modernization of the CFHS Group and BCD-related activities over the past year including clinical training initiatives; research and development; international collaboration; regulatory affairs; and the status of the Strategic Medical Counter-Measures Program (SMCP) (previously, the Biological Weapons Threat Medical Counter-Measures Project). The status of the Committee's recommendation that consideration be given to the replacement and relocation of the Central Medical Equipment Depot (CMED) was also discussed.
- **DRDC Corporate Office - Ottawa (8 October).** The Chief of Staff to the Assistant Deputy Minister (Defence Research and Development Canada) (ADM (DRDC)), chaired a VTC discussion of current issues with DRDC Corporate Office subject matter experts. Agenda items included an explanation of the new corporate business model and Defence and Security Science and Technology Program; corporate, domestic, and international research delivery vehicles; support to the pandemic response; the status of responses to recommendations in the Committee's 2019 Annual Report; and preliminary observations made during the 2020 round of VTCs.
- **Standing Senate Committee on Foreign Affairs and International Trade (14 December).** The Committee Chair, Dr. Durham, at their invitation, appeared

before the Standing Senate Committee studying Bill S-2, “An Act to amend the Chemical Weapons Convention Implementation Act”.

OBSERVATIONS

General. Notwithstanding the prevailing effects of the pandemic, the Committee was warmly welcomed and received complete and proactive cooperation of authorities at all the headquarters, units, and agencies with whom we met. Presentations made during the VTCs were relevant, focused, and detailed and the discussions that followed were free-flowing and transparent.

Threat. The briefings that the Committee received from Canadian Armed Forces Intelligence Command/Directorate of Scientific and Technical Intelligence attested to continued credible biological and chemical warfare threats from both state and non-state actors, which necessitate appropriate defensive preparedness.

Defensive Capability. During its VTCs, the Committee had occasion to receive information and ask questions about capability requirements and procurement plans; research and development facilities and activity; in-service equipment and other materiel; doctrine; and training. In all instances, the Committee was satisfied that these pertained solely to the defensive functions of BCW agent detection, identification, and monitoring; information management (*e.g.*, warning and reporting); protection; hazard management (*e.g.*, decontamination); and MCM. The Committee assesses such functions as being consistent with the maintenance of a purely defensive capability.

Compliance with Policy and International Conventions

DND/CAF chemical and biological defence policy is set out in Defence Administrative Order and Directive (DAOD) 8006-0 (accessible on the Internet). Following our VTC with the DRDC Corporate Office on 8 October, the Committee received written certification from the Director-General Science and Engineering, Director General Program Formulation and ADM (DRDC) that the projects in the FY 2020-21 DRDC R&D program related to BCD, for which they are responsible, are compliant with the provisions of DAOD 8006-0 (CBRN Defence) and DAOD 8006-1 (CBRN Defence Operations, Training and Capability Development and Sustainment).

The Committee solicits and receives information on current research and development projects including those undertaken by DRDC contractors. This information includes detailed project descriptions, resource allocations and progress reports.

Occasionally, due to historical activities at CFB Suffield, legacy munitions meriting treatment as suspected historical legacy chemical weapons are found on the restricted-access experimental proving ground (EPG) or in the military training area at Suffield. These munitions are reported to NDHQ and the OPCW and permission is requested for their destruction. The latest information the Committee has in this connection is the

report of the destruction on 11 May 2016 of the suspect aerial spray tank discovered on 24 July 2015 and noted in the BCDRC 2015 Annual Report. There have been no further discoveries since that time of which we are aware.

From time to time, the Organization for the Prohibition of Chemical Weapons (OPCW) conducts verification inspections of Canadian chemical defence research and development facilities. The most recent of these, an inspection of the Canadian National Single Small-scale Facility (CNSSSF) at the SRC, was conducted 21-23 October 2019. During our next physical visit to Suffield, we will ask to examine the inspection report.

Safety

Following the cancellation of the Committee's originally scheduled physical visits to the SRC, we requested the Centre Director to provide a synopsis of actions taken to maintain the safety and security of the Centre at the outset of the COVID-19 pandemic. We learned the following:

- The Centre was informed by DRDC Corporate Office on 15 March that it was to adopt a minimal manning posture beginning the next day at which time only the Acting Centre Director; the Assistant Director, Corporate Services Operations; facilities engineers; security staff; and the General Safety Officer would have approval to be on site. All other personnel were required to work from home with any attendance at the workplace managed by exception.
- The Heads of the Biological Threat Defence Section and the Chemical and Biological Assessment and Protection Section received approval to come in to work immediately in order to identify actions that were required to maintain instrumentation, facilities, and holdings of biological and chemical material.
- Additional critical personnel were identified and tasked by Section Heads to come in to work to secure materials and place instrumentation in an appropriate standby state.
- At this point, the Containment Level 3 (CL3) laboratory had already commenced its annual maintenance shutdown with contractors standing by to start work. Due to the likelihood that the facility could be called upon for pandemic-related work, a decision was made to carry out the maintenance programme and reopen the laboratory as scheduled.
- In the days and weeks that followed, Section Heads governed the return of individuals to the workplace on an *ad hoc* basis to collect work, maintain instruments and check infrastructure, etc. On these occasions, a regime of physical distancing and increased cleaning of high touch areas was enforced.
- Information technology tools such as Office 365 were made available to facilitate work from home.

- ADM (DRDC) directed that maintenance of employee mental health be accorded the highest priority of effort.
- Some regular Program work was paused or re-purposed in support of the COVID - 19 fight.
- Since 21 May, Centre operations have been regulated by the Chief of the Defence Staff/Deputy Minister Directive for the Resumption of Activities, which envisions a staged return to work. As of 10 September, SRC was at Stage 3 – Additional Training and Institutional Activities (“only those activities that are necessary to stop the immediate erosion of CAF readiness ... and critical supporting and institutional activities that are aligned with established priorities are being undertaken.”) but ready to move to Stage 4 - Operations and Activities in a Latent COVID-19 Environment. (“... no longer be responding to the pandemic but not returned to a pre-COVID-19 posture. Remote work will continue, and workplace occupancy rates will likely remain below pre-COVID-19 rates.”)

While the Committee was unable this year to conduct its routine inspection of microbiological, viral and toxin holdings, our discussion with the bioarchivist at Suffield indicated that work to establish a complete and accurate database of holdings is ongoing. As reported last year, the toxin inventory requires further effort to validate current stocks, integrate the inventory database with that of other biologicals, and establish ownership by current researchers, given that most of these stocks have not been used for some time.

Work continues to update the following key publications:

- “Standard Operating Procedure for Acquisition, Management, Accounting and Usage of Risk Group 2 and Risk Group 3 Biomaterials and Toxins at DRDC Suffield”
- bio-security manual
- biological laboratory operating manual, to ensure compliance with the provisions of the Human Pathogens and Toxins Act and with new Canadian Biosafety Standards (this update is complete pending receipt of information regarding operating procedures for a new autoclave)

Last year, the Committee observed that control and accounting procedures for chemical holdings remain satisfactory, strengthened as they were in 2016 by the establishment of limits on the amount of agent that can be synthesized on strictly local authority, and by new provisions for the tracking of the destruction of samples or sub-stocks of agent on completion of projects and exercises. The Committee continues to emphasize the importance of consistent compliance with the Centre’s policy of recording agent use from “cradle to grave”.

In our 2018 report, we closed, as having been largely implemented, our recommendation pertaining to support of the Chemical Safety Review launched in 2012. We continue, however, to follow the implementation of two of the review’s recommendations:

- The first is the introduction of a medical surveillance program to include monitoring of acetylcholinesterase (AChE) levels in pertinent laboratory personnel. This initiative had been problematic due to restrictions on access to, and use of, the unlicensed AChE monitoring device in the context of an occupational health monitoring program for public servants. On 16 January 2020, the Centre Director released to relevant section heads, a memorandum entitled, “Acetylcholinesterase (AChE) Monitoring Programme (AMP)” wherein he reported that a Medical Advisor having been hired by the Centre, use of the monitoring device was now permitted under Alberta College of Physicians and Surgeons guidelines for Unaccredited Point-of-Care Laboratory Testing. The memorandum goes on to stipulate provisions for the implementation and conduct of the monitoring program. As such, the Committee now considers this remaining aspect of the Chemical Safety Review to be complete.
- The second is the agent-worker certification (AWC) program. Last year, we learned of concerns related to the coherence and rigour of the program. To ensure that agent-handling staff achieve a consistent skill and confidence level in order to operate safely, we recommended that the AWC framework be verified and thereafter continuously maintained and updated under document control. This year, we learned that in response, a team comprising scientists and technologists has reviewed the program and made a number of proposals aimed at eliminating logic gaps, simplifying structure, distinguishing between assessors and mentors, providing for recertification of graduates when required, and making the Chemical Safety Officer responsible for program documentation control. These proposals have been accepted and are being implemented. We also understand that the program will be reviewed again in two years’ time to ensure it remains fit for purpose. As such, the Committee will close our 2019 recommendation as having been implemented.

Based on our discussions with the SRC General Safety Officer (GSO) and the Chair of the Biosafety and Chemical Safety Committees, we believe the Biosafety Committee continues to operate effectively. In this connection, we are pleased to note that a replacement for the recently retired Biosafety Officer has been appointed. The Committee is developing a list of MCM relevant to current work. Also, in accordance with laboratory licensing requirements, a training needs assessment for staff working in the CL2 and CL3 facilities has been submitted to the Public Health Agency of Canada and the Canadian Food Inspection Agency.

On the other hand, concern was expressed about the functioning of the Chemical Safety Committee. We heard that items on the Committee's agenda have been too long left unresolved and that membership and terms of reference need a refresh. The Chair of the Biosafety Committee has recently been "double-hatted" as Chair of the Chemical Safety Committee, which in our view is undesirable, given the individual's already existing workload. We also noted that the Chemical Safety Officer has been, until recently, on parental leave. The GSO indicated that he had received and investigated nine hazardous occurrence reports since our visit in May 2019. These included seven minor occurrences: a chemical spill in a fume hood; a mislabelled waste jar found in a recycling bin; a fall; three observations of improper material handling (moving/lifting); and a chemical burn sustained from contact with a caustic solution. No serious injury or significant damage resulted from these incidents and appropriate follow-up corrective action has been taken.

The eighth incident involved a "refusal to work" arising from confusion over new emergency response team standard operating procedures. Adjustments were made to the procedures to the satisfaction of the subject employee.

The final incident occurred in February 2020 and involved a chemical spill. The affected area was decontaminated, and an employee was later transported to Medicine Hat Hospital for over-night observation and released. This incident prompted an investigation by the Centre Director. We expect to learn the results of same during our next physical visit.

Our Committee was also made aware of employee desire to reinforce laboratory emergency preparedness. We also detected a desire for more open communication around safety issues between management and front-line staff. The CD is aware, and we anticipate that the recent return to duty of the Chemical Safety Officer should improve the situation.

We suggest that the Chemical Safety Officer take part in the routine activities of the laboratories in order to develop good relationships with staff, observe laboratory practices at first-hand, respond informally to concerns, and assess safety culture.

Following the chemical emergency response exercise, which we observed during our 2019 visit, fire department participants stated they would value more information with respect to the chemical hazards they could potentially encounter when responding to calls at SRC facilities. This concern related particularly to chemicals with elevated safety and security considerations. As a result, we recommended that authoritative information on the management of incidents involving unique risk factors at Suffield be provided to first responders such that they may effectively and safely operate during an emergency. We were therefore pleased to learn that a document containing such information for release to appropriate DND/CAF personnel is nearing completion.

We were told that the project to replace flammable liquids storage cabinets, as recommended in the 2016 Canadian Forces Fire Marshal's inspection report, has been completed. Attention has now turned to gauging the potential for additional compartmentalization of Building 1 as suggested in the Fire Marshal's 2017 inspection report. Replacement of the building's back-up generator and the forecast completion in 2021 of a new 25 kilo-volt electricity supply also constitute significant improvements to safety and security.

Given the nature of the research and development undertaken at SRC, the occupational health and potential emergency medical support needs of the Centre are relatively specialized and complex. During past annual visits, we have become aware of several seemingly problematic aspects of the Centre's situation in this regard and the challenges to which they, from time to time, give rise. We have also learned of the diligent and effective efforts of the many stakeholders involved to confront and overcome these challenges with a view to maintaining the completeness and consistency of the required support system. This said, we have also noticed a tendency for issues to re-emerge due to circumstances beyond local control, *e.g.*, contracting of medical advisors, changes in military medical personnel, treatment protocols, and the commercial availability of MCM.

These observations led to the inclusion in the Committee's 2016 report the recommendation that a comprehensive assessment of occupational health and emergency medical support needs, including verification that these needs are being met, be conducted by an appropriate high-level authority, with the participation of relevant stakeholders. The objective of this undertaking would be to ensure the long-term adequacy and stability of these essential supports to the work of the SRC. We further suggested this same authority should also take the lead in designing and implementing cooperative, long-term solutions to any gaps so identified.

In the years since, notwithstanding this recommendation *per se* has not been acted upon, we have noted several substantial and enduring improvements commendably effected locally by SRC, CFB Suffield and others with the support of regional and national level authorities. Foremost amongst these was the engagement of a Medical Advisor by SRC. We also commend, as indicated in the DND/CAF response to our 2019 Annual Report, the recent updating of the Health and Safety Management System manual, which describes the various elements of the SRC Health and Safety Program; the initiative to undertake a job hazard analysis; and the completion of an Integrated Emergency Response Plan. Consequently, our major concerns have been alleviated – at least temporarily.

We continue to believe, however, that the components of an occupational health program and an emergency medical response capability that meet the needs of SRC (and which already exist in large measure) should be locally defined and incorporated in a tool such as the existing SRC Risk Management Framework and their status monitored with a view to quickly flagging to management the re-emergence of deficiencies. Moreover, where appropriate, these components should be cemented in place by officially

promulgated policy or formal agreements between parties including non-DND or non-CAF parties to avoid slippage and dependence on specific personal relationships. As soon as the first of these steps is completed, the Committee would be inclined to close the recommendation as having been superseded by other actions.

One such aspect of this Risk Framework is the preparedness of the Suffield Base Surgeon to lead a response to a medical emergency involving biological or chemical warfare agent. The desired protocol to address this requirement has hitherto been for new Base Surgeons to be sent on selected UK or US CBRN medical training courses prior to their arrival in Suffield. This year, on meeting the new Base Surgeon during our VTC, we discovered that due to the disruption caused by the pandemic, these courses were not available. We learned, however, that as a substitute, a Canadian competency-based training course has been designed combining curricula from the currently accredited courses and making use of the expertise and specialized training facilities available at the Suffield Research Centre. We further understand that it may be made available to selected local civilian practitioners. There may also be training opportunities for first responders. We applaud this initiative and wonder if it might give rise to a permanent Canadian solution.

In this connection, we also commend the idea of SRC to provide to the local health authority documented treatment protocols for biological exposures as an important contribution to upholding the effectiveness of local response to potential medical emergencies.

This Committee has regularly and consistently expressed the view that the SRC is a strategic national asset and, as such, its infrastructure deserves commensurate care and attention. The main laboratory building, Building 1 (which also houses the Centre's administrative offices), is more than sixty years old and, as long ago as the Barton Report of 1988, was identified for replacement. Apart from the age of the building, the Committee has harboured a long-standing safety concern about the co-location of scientific and administrative functions – a concern exacerbated by the advanced age of the chemical and biological laboratories. Our unease has been mitigated over the years, to an extent, by the diligent attention of SRC management and employees to building maintenance and safety including emergency response exercises; by the prospect of the construction of a new laboratory complex; and, most important, by the proposal to place new modular CL 3 laboratories in the shell of a nearby building (the so-called Modular Biological Containment Facility (MBCF)) pending their ultimate relocation to the new complex. The Committee has followed closely the progress of both projects.

In 2017, we were told that with the transfer in 2014 of Suffield real property responsibilities from the Army to the Assistant Deputy Minister Infrastructure & Environment (ADM IE), these projects were subjected to a re-definition of requirements and, also, re-prioritization in competition with other projects from across the country. We also learned that the DRDC Corporate Office had assumed the Project Director role for

these projects, with which responsibility comes a budget to assist with the definition of requirements.

This year, we were told that the separate MBCF project has been side-lined in favour of building the new laboratory complex, possibly in stages. The rationale for this change is that the planned completion date for the two projects has been converging with the MBCF due to be commissioned only a few years before the larger project. The new, unified endeavour is titled the Laboratory Modernization Project. A modified site has been selected and contracts for preliminary studies (environmental impact, topographic, geophysical, *etc.*) have been awarded. Current estimated cost is \$275-350M with occupancy anticipated to occur within 12-15 years. Given this timeline, contingency plans for catastrophic failure of the existing infrastructure are apparently being developed. We will be interested to learn more about these plans as we believe that it is likely the aging biocontainment facility will fail before the modernization project is completed. The lack of such a facility at SRC, even temporarily, would jeopardize Canada's ability to meet its domestic responsibilities and international commitments.

In contrast to the decision not to proceed with the MBCF, we note that significant renovations to Building 10, which houses the Casualty Management Section, have been launched to address significant instances of non-compliance with Canadian Council on Animal Care (CCAC) standards; in particular, the requirement for separation of laboratories and offices from the vivarium and the separation of species therein. We applaud this rapid response to the Council's concerns. We would also remark that as appreciation grows that safety and service delivery are increasingly compromised by the aging infrastructure at Suffield, decisions to undertake temporary solutions involving the renovation or upgrading and then maintenance of existing buildings will likely occur more often, incurring large costs that will grow as construction on the new complex is delayed.

On a more positive note, the flexible design principles being promoted for the new structure should help avoid obsolescence over time. In this vein, care should be taken to coordinate the purchase of major laboratory equipment and the availability of trained staff with building completion so that the facility and its installations are both state of the art at the time of occupancy.

We will look forward to further updates. In the meantime, we will continue to stress the importance of infrastructure renewal to program safety and continuity.

Environmental Protection

The SRC Acting Environmental Officer reviewed the various environmental management programs, which include environmental impact assessments; species at risk; wastewater; halocarbons; air emissions; hazardous material; storage tanks; spill prevention and response; and contaminated sites risk management.

Generally, these programs are operating effectively and efficiently.

Last year, we reported that the Centre's ability to properly dispose of hazardous waste and surplus hazardous chemicals was essentially equal to the rate of its creation. The sole remaining challenge was the disposal of used filters from fume hood ventilation systems in Building 1. This year, we were pleased to learn that a solution to this problem has been found that will see the used filters decontaminated by qualified SRC staff prior to their removal from the site.

Regarding Species at Risk, it came to our attention that one such species, the Western Tiger Salamander, had had to be relocated from habitat at the Ritzel blast test centre due to maintenance activity. We were unable to ascertain the status of these amphibians in their new location and hope to learn next year that they are safe and healthy. We will do so in the context of a closer examination of the DRDC-SRC Species at Risk Work Plan.

Contaminated sites management consists essentially of the fencing off and signing of sites. Application of the Federal Contaminated Sites Action Plan to the Experimental Proving Ground at Suffield is another topic we intend to pursue in future.

We were reminded that environmental review is required for every new field trial and all trial renewals and that this requirement is built into SRC's Online Turbo Approval Process (OnTAP). Some 20 such reviews were conducted in FY 19-20. This said, we also learned that OnTAP, which applies to all research and development initiatives will be updated in the coming months to address software issues and to incorporate consideration of the appropriate application of regulations under the Human Pathogens and Toxins Act as an approval criterion.

In accordance with the stipulations of DRDC's Corporate Safety and Environmental Management System, the SRC Health and Safety and Environmental Management Systems were recently integrated. An external verification of the integrated system was carried out during the autumn of 2019. Thirteen items of "non-conformance" were identified and a further 13 observations made, which are being addressed.

SRC's CBRN Material Risk Management Framework, described in our 2017 report, remains an effective way of describing the Centre's organizational assets; categorizing the threats to these assets; assigning responsibilities for risk management; and establishing a set of facility, personnel and material risk indicators and corresponding risk management performance indicators. The performance indicators are commendably comprehensive and map well to our Committee's inspection and verification mandate.

Perhaps we will see specific indicators of environmental protection performance included in the Framework, similar to our previous suggestion with respect to risk management of occupational health and emergency medical response.

Other Observations

- **SRC/CFB Suffield**
 - The Committee recognizes the acute challenges faced at SRC since the outset of the COVID-19 emergency, both in managing a suddenly dispersed and vulnerable workforce and in responding to a surge of requests for assistance from defence and public health entities. We commend one and all - managers, scientists, technologists, and support staff alike - for the courage, adaptability, and determination they have displayed in putting their expertise and facilities at the disposal of the nation while implementing and conforming with measures to guard the health of all employees.
 - Notwithstanding persuasive pandemic-related restrictions and impediments, we believe the Centre pivoted in impressive fashion to focus its capabilities on counter COVID-19 activities. These have included:
 - support to medical intelligence
 - anti-viral research
 - provision of diagnostic capability support to Canadian Forces Health Services
 - measurement of the continued effectiveness of the N95 mask after repeated reuse and after sanitization measures
 - measurement of comparative effectiveness of the N95 and other reusable and disposable face masks
 - provision of advice related to the transmission of the virus, diagnostics, personal protective equipment, and decontamination
 - In 2019, the Committee observed that maintenance of the required level of knowledge, skill and experience amongst the research and support staff at the SRC is a formidable task. SRC senior management has stated, and we concur, the looming retirements of some of the Centre's most experienced and knowledgeable staff in crucial positions, together with the Centre's aging infrastructure, remain the leading risks to the execution of its mission.
 - An orderly succession plan, including the timely hiring and training of new staff, constitutes the obvious mitigation strategy for the "retirement risk". Overlap with retirees will preserve critically important corporate memory and ensure continuity of operations. Succession planning is a complex problem involving the forecasting of retirements and absences; recruiting; security clearances; deployment; training; knowledge transfer; depth and redundancy of expertise; and budgets. There are also major safety and staff morale aspects to be considered in light of the work associated with some of the positions

requiring immediate attention. In certain instances, positions left vacant or filled by underqualified persons could constitute non-compliance with legal requirements. DRDC leaders are aware of these problems and are actively seeking solutions. Given its safety dimension, we believe this matter falls squarely within our mandate and, as such, recommended in our 2019 Annual Report that leaders up to and including ADM (DRDC) take deliberate note of this issue, carefully examine its components, and then redouble their efforts to implement an enduring solution. We credit DRDC for its effective initial response to this recommendation noting the development and implementation by the DRDC Director-General Science and Engineering of a multi-phase succession plan, which commenced in July 2019. We are told that all forecasted retirements at Suffield Research Centre have been reviewed and approved for replacement, with inclusion of a hand-over period for those positions with unique and critical knowledge and skillsets (*e.g.*, Bio-Safety Officer). This said, we are led to believe that there remains some turbulence around the replacement of the head of the Chemical Synthesis and Characterization Group. This group is responsible for the Canadian National Single Small-Scale Facility (CNSSSF) and, as such, its head is a crucial, one-of-a-kind position. We understand that a human resources policy restriction on the start of a search for a replacement may lead to this position being vacant for a time. Fortunately, near term requirements for chemical synthesis for training have been met; however, we are concerned over the risk of losing the specialized expertise needed for more complex syntheses of newer generation agents should they be required. The CNSSSF exists in accordance with the provisions of the CWC and is subject to regular inspection by the OPCW. There is no room for error in its operation.

- Looking ahead, we were informed of a proposal to restructure this group to accentuate and strengthen its principal functions - that of agent synthesis, and that of oversight, including “cradle to grave” management of chemical holdings and enforcement of the provisions of the CNSSSF and Controlled Substances Act licences. The Committee believes this to be a sensible approach.
- More generally speaking, we acknowledge that keeping the research and development sections at SRC fully staffed is a perpetual challenge given the specialized skills and knowledge required and the relative remoteness of the location. As such, section heads spoke of the value they attach to the increasing understanding and support of corporate human resources authorities. We also heard appreciation expressed for recent success in securing new corporate services positions or filling vacancies locally.

- A meeting with the SRC Security Officer responsible for both physical and information security are now a standard item in our visit agenda. Upgrading of the Centre's capability and capacity for secure computing and communications remains a priority concern. Work is in hand to address these deficiencies with the completion of a secure computing wing in Building 1 comprising nine workstations being the latest accomplishment. A project has been initiated to construct a secure VTC facility with seating for 25 to 30; however, it is several years from completion.
- Other security related initiatives include completion of upgrades to building intrusion alarms, access control systems and CCTV monitoring systems. Critical Incident Response protocols such as "lock down" and "shelter in place" are being introduced and exercised – these being distinct from emergency response protocols applicable to laboratory incidents, for instance. Also, public service staffing of the security group will be increased in accordance with the DRDC corporate security staffing model. Productive relations between SRC and CFB Suffield authorities are essential. As they have in recent years, our meetings with the Base Commander, the Centre Director, the corporate services manager and other SRC staff have been denoted by a common refrain, that being that relations are good and growing stronger with a focus on common goals and mutually beneficial outcomes. Specifically, we noted the report of close collaboration on pandemic response and the intention to refresh the service level agreement between the base and SRC later this year.
- **DRDC Centre for Security Science**
 - Tracing its origins to the aftermath of the September 2001 terrorist attacks, the CSSP not only remains relevant, but it also compellingly demonstrates the leverage to be gained from modest expenditures when these are coordinated with other agencies and allied nations in pursuit of common interests across public safety, security and even defence domain boundaries.
 - Recently, an emerging project theme has been on surveillance systems aimed at early detection of risks to human and animal health and to the integrity of the food supply.
 - This year, enlisted in the whole of government effort to counter the effects of the COVID-19 pandemic, the Centre quickly reallocated some \$25M of its program money to COVID-related projects, for which it is to be commended.
 - We were also interested to note the recent organizational change that, we understand, will see the CSS more closely integrated with the rest of DRDC. We look forward during future visits to learning more about this restructure and discerning its impact on the CSSP and other work.

- **Canadian Joint Immediate Response Unit - CBRN**
 - While we look forward to our next opportunity to meet unit members in person, the programme assembled this year by the Commanding Officer and his staff allowed us not only to strengthen our understanding of the unit's force employment and development concept and direction, but also to delve more deeply into Canadian Special Operations Forces Command training safety regulations and practices including provisions for environmental protection. Moreover, the presence of the Medical Officer and Legal Advisor on the VTC lent itself to an insightful discussion of specialized CBRN Defence medical training as well as pertinent medical policy, regulation, governance, and treatment topics.
 - Indeed, our opinion of the unit remains high and our perception of the essential value of its contribution to the security and defence of Canada is reinforced, especially as the international norms restraining the use of biological and chemical weapons by both state and non-state actors are eroded.
- **CF Intelligence Command, ADM Policy and Global Affairs Canada**
 - As in previous years, transparency and frankness typified our talks with intelligence and policy staff at NDHQ and with personnel from GAC. They provided briefings not only on the threat landscape and the status of the BTWC and CWC, but also, as they have generously done before, the Weapons Threat Reduction Program, which is Canada's contribution to the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction.
 - As stated earlier in this report, the intelligence staff briefings we received attested to continued credible BCW agent threats from both state and non-state actors, which necessitate appropriate defensive preparedness. We were informed that the monitoring and ongoing assessment of the threat landscape relies upon the expertise of an exceedingly small number of experts whose ranks further diminished this year due to retirement. During our visit to the DRDC Corporate Office, we also heard expressed the desire for more CBRN intelligence input to the formulation of the research and development program and that the ability to infer adversarial intent deserves more attention. As such, it would seem to the Committee that an enhancement of Canada's ability to assess biological and chemical threats would be welcome.
 - The update on the CWC outlined the successful effort by the OPCW to secure international agreement to include nerve agents of the type used in Salisbury UK within the CWC control regime. This addition led to a decision by the Government to introduce a bill to Parliament to amend the CWC

Implementation Act to simplify the Act's reference to the schedules to the Convention. At the invitation of the Senate Standing Committee on Foreign Affairs and International Trade studying the bill, our Committee Chair explained the role of the BCDRC and spoke, on behalf of the Committee, in support of the bill's provisions.

- The Coordinator, Canadian National Authority (CWC), outlined for the Committee, Canadian declarations of compliance with the Convention and provided a list of current licenses for the use of chemicals subject to the CWC control regime.
- Major issues pertaining to the BTWC are:
 - lack of universality of adherence – 14 states remain outside the Convention and not all States Parties have effectively implemented it
 - lack of the institutional infrastructure and verification regime possessed by the CWC – instead, it essentially relies on good-faith adherence by States. (A three-person Implementation Support Unit serves as treaty secretariat and “declaration” of confidence building measures (CBM) by States improves transparency by sharing information on CL4 laboratories, biological defence research programs, disease outbreaks that deviate from normal patterns, scientific publications of relevance, a declaration of past offensive, and programs post-1946, and vaccine production capacity. Canada regularly submits CBMs and makes them available to the public).
 - Dual-use Research - almost all biological research intended for peaceful purposes can be misused or to develop or to produce biological weapons. It is becoming increasingly difficult to prevent biological weapons proliferation while still enabling unimpeded research in the life sciences.
 - financial viability – lack of a working capital fund
- We have, for several years, been impressed by the extent and impact of our country's involvement and applaud the growing number of projects with partner countries, international organizations, NGOs, and other government departments aimed at mitigating threats posed by CBRN weapons and related materials. We were, therefore, pleased to learn that the mandate of the Weapons Threat Reduction Program has been extended indefinitely with a funding level of \$73.4 million. Key activities are prevention, detection, and response to weapons of mass destruction threats; securing or destroying dangerous CBRN materials; improvement of security at facilities; strengthening of global networks; and building partner capacity to meet international obligations.

- **Directorate of Joint CBRN Defence**
 - The Army's D JCBRN D is responsible for the development of joint CBRN defence capabilities to enable the armed forces to survive and operate in a CBRN-contaminated environment at home or abroad. In this connection, one of its principal tasks is the provision of guidance to DRDC with respect to the BCD R&D program. The Directorate remains most helpful to the work of the Committee, having this year provided us with an update of completed, divested, active and proposed projects.
 - BCD capability development is paused this year as the current "omnibus" equipment procurement project comes to an end and work begins to define new projects based on direction in the Strong, Secure and Engaged defence policy.
 - We were pleased to meet the new Director who provided a thorough and insightful update of the Directorate's recent activities and current issues pertaining to capability development and the provision of operational and strategic-level advice and support. We understand that the Chief of the Defence Staff is expected to soon release a new Joint CBRN Defence Directive – one which will assign functional authority to the Army Commander. As such, we look forward to next year's meeting and learning more about the future course of Biological and Chemical Defence.
- **CFHS Group HQ**
 - BCD-related advanced clinical training for medical personnel posted to Suffield is a matter we have followed for several years. In the past, when availability of personnel and funding have coincided, attendance by clinicians on UK or US courses has met this requirement. This year, the disruption caused by the COVID pandemic precluded this option. We remarked earlier in this report on the design, as a substitute, of a Canadian familiarization or bridging course. The Operational Medical Section of CFHS Group HQ played a key role in this initiative as did other medical and DRDC authorities at local, regional, and national levels. We commend their collaboration and look forward to further developments.
 - International collaboration continues within two frameworks. The first is that of NATO's Committee of Chiefs of Medical Services (COMEDS) where contributions are made to the CBRN Medical Working Group and the Biomedical Expert Panel. The second framework is that provided by the Chemical, Biological and Radiological Memorandum of Understanding (CBR MOU) between Australia, Canada, the United Kingdom, and the United States

within which the CBRN Medical Counter Measures Consortium operates and research and capability development efforts are coordinated.

- Notable research and development activities currently under the direction of CFHS include plague vaccine, evaluation of potential prophylaxis against opioid threats and SARS COV-2, and new auto-injectors.
- In our view, Regulatory Affairs remains proactive, diligent, and effective in ensuring adherence to Health Canada and DND regulations and policies for the reporting, accounting, and handling of unlicensed medical products; advising on regulations for their use; and seeking regulatory approval for them, where feasible. The section is also effective in providing product development support to the Strategic Medical Countermeasures Program (SCMP), DRDC research, the Medical Countermeasures Consortium, manufacturers, and allies. We also commend their involvement in the whole-of-government effort around pandemic preparedness and response.
- The SMCP (formerly the Biological Warfare Threat Medical Countermeasures Project (BWTMCM)) appears to be progressing well notwithstanding the emergence of a requirement to verify the assumptions underlying its procurement and stockpiling model.
- We remain strong in our support of the need to replace and relocate the CMED, but understand this may not occur for many years – the project being 35th on the relevant list of CAF infrastructure priorities. In the meantime, we are happy that renovations to bring the laboratory room up to GMP standards are underway. We commend the efforts of CFHS Group to address the risk to which this situation gives rise, and hope that the current heightened public awareness of the importance of appropriate medical equipment and pharmaceutical supply and distribution facilities will be of benefit in this connection.
- **DRDC Corporate Office**
 - The objective of the new five-year program for both CBRN defence and MCM research and development is to enable the CAF to conduct operations, with agility and effectiveness, in any domestic, continental, or international environment where there is a risk or threat of the use or release of CBRN material, with a focus on new and emerging threats including pharmaceutical-based agents.
 - The scope of the program will comprise:
 - provision of critical evidence-based information on CBRN threats/hazards to enable planning and development of policy, doctrine, and tactics

- delivery of enabling, integrated technologies that provide rapid detection, identification, and monitoring of CBRN threats/hazards
 - development of protection technologies that minimize the harm to personnel, equipment, and infrastructure from exposure to CBRN material
 - provision of specialized CBRN training and reach-back capability as required to support CAF operations
 - provision of science and technology to mitigate and reduce the immediate and long-term health effects of exposure to these hazards
- We should also expect to see increased engagement with academia, industry, and other government departments.
 - We maintain that the challenges associated and the replacement of retiring scientists and technicians and with aging laboratory infrastructure pose a steadily increasing risk to the sustainability of an effective and safely conducted chemical defence research programme. We note that DRDC shares these concerns and commend their efforts to address them, such as the recent improvements to succession planning. Infrastructure projects are notoriously difficult to advance given the Government's vast holdings of real property. Here too, we note their involvement especially with what we were given to understand was a recent appearance before the Independent Review Panel on Defence Acquisition. Might the dramatically heightened profile of pandemic preparedness and the apparent erosion of international norms around the use of biological and chemical weapons serve to accelerate the replacement of the Suffield laboratories?
 - Finally, we commend DRDC for the way it has activated its resources and expertise in response to the COVID-19 pandemic, be it assisting the CAF, leveraging ongoing investments, helping to mobilize industry or funding near-to-market solutions, or contributing to international initiatives through existing partnerships.

CONCLUSIONS

Having detected no evidence to the contrary during its 2020 briefings and “virtual visits”, the Committee concludes that:

- Canada's policy of maintaining a purely defensive biological and chemical warfare capability is fully respected by the DND and the CAF.

- The BCD research, development and training activities undertaken by DND and the CAF are fully compliant with Canada’s obligations as a State Party to the BTWC and CWC.
- The BCD research, development and training activities undertaken by DND and the CAF pose minimal risk to public safety or the environment.
- There is no covertness or duplicity within the BCD program.

RECOMMENDATIONS

The Committee this year offers one new recommendation:

“The terms of reference, composition and operation of the Chemical Safety Committee at the Suffield Research Centre should be reviewed and, if necessary, modified to ensure that it effectively contributes to the maintenance of a safe workplace.”

STATUS OF COMMITTEE RECOMMENDATIONS

Please see Annex A for DND/CAF responses to Committee recommendations.

ANNEXES

A – Status of Committee Recommendations

B – Acronyms and Abbreviations

STATUS OF COMMITTEE RECOMMENDATIONS

1. **(2014)** *We encourage acceleration of the final approval and funding of the project to replace DRDC Suffield's BSL 3 suites in Building 1 in an expedient manner compatible with safe continuation of the biological program in both the short and long term. [This recommendation has been reworded to better reflect the situation in 2019]*

DND/CAF Response (July 2015): "During 2014, DRDC reviewed the original 2004 requirement and has invested significant effort to revise the Statement of Requirement (SOR), update the project identification documents (SS(ID)), and review the main options for presentation to a senior review board (SRB) in April 2015. This will be the first official stage in getting what amounts to a new \$14M project into the DND infrastructure investment plan."

BCDRC Comment (December 2015): We commend this effort and will closely monitor further progress of this vital undertaking. In the meantime, we urge that the maintenance of critical systems in Building 1 continue to receive diligent attention.

DND/CAF Response (September 2016): "DND/CAF has initiated a process for the replacement of the biological laboratories at the DRDC Suffield Research Centre for handling of risk group 2 and 3 biological agents. This project has been identified in internal development and acquisition plans and is undergoing options analysis and review. Taking into account administrative processes, the anticipated timeline to update existing facilities is 3-5 years. While this process continues, DRDC continues to exercise its extensive preventative maintenance program"

BCDRC Comment (December 2016): We acknowledge the additional complications introduced by the transfer of real property responsibilities to ADM IE but continue to urge priority attention to this project. We will continue to monitor and report progress.

DND/CAF Response (April 2017): "During the transfer of responsibilities to ADM (IE), the review of outstanding infrastructure projects resulted in a significant improvement in the recapitalization of the Suffield Chemical and Biological Laboratories as it has become the highest rated ADM(S&T) project within the ADM(IE) major construction queue. While it still remains in the unfunded queue, it is expected that this improvement will result in concrete action in the near future. The interim replacement of the biological laboratories continues through the capital equipment program."

BCDRC Comment (December 2017): Continuing to see, as we do, serious infrastructure issues, we applaud the appointment of a Project Manager who will be instrumental to moving the project forward.

DND/CAF Response (April 2018): "During the transfer of responsibilities to ADM (IE), the review of outstanding infrastructure projects resulted in a significant improvement in the recapitalization of the Suffield Chemical and Biological Laboratories, as it has become the highest rated ADM (S&T) project within the ADM (IE) major construction queue. While it

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still remains in the unfunded queue, it is expected that this improvement will result in concrete action in the near future. The interim replacement of the biological laboratories continues through the capital equipment program; a Statement of Requirements is currently being drafted for this replacement.”

BCDRC Comment (December 2018): While both projects are gaining momentum, there is concern that despite their intimate connection, the MBCF project risks becoming de-linked from the longer-range laboratory re-capitalization (which is ranked as DND’s number one priority project within its price range). Were this to occur and the MBCF project abandoned, the continuity of the biological defence programme would be threatened, given the likelihood that the aging current bio-containment facility will fail before the laboratory recapitalization project is completed. The lack of a bio-containment facility at SRC, even temporarily, would jeopardize Canada’s ability to meet its domestic responsibilities and international commitments.

DND/CAF Response (February 2019): “During the transfer of responsibilities to ADM (IE), the review of outstanding infrastructure projects resulted in a significant improvement in the recapitalization of the Suffield Chemical and Biological Laboratories, as it has become the highest rated ADM (S&T) project within the ADM (IE) major construction queue. While it still remains in the unfunded queue, it is expected that this improvement will result in concrete action in the near future. SRC was visited by ADM (IE)’s Project Director for SRC’s recapitalization project and a member of his support team from Defence Construction Canada to meet key staff and discuss the information needed over the next 24 months that will form the package required to enable project definition. The interim replacement of the biological laboratories continues through the major capital equipment program; however, there are currently insufficient human resources within ADM (S&T) to complete the requirements needed to advance progress to the next stage with ADM (Mat).”

BCDRC Comment (December 2019): At DRDC Corporate Office, the Committee was updated on potential strategies for the replacement of the aging Containment Level 3 suites. The recommendation will remain open. The Committee will continue to stress the critical importance of infrastructure renewal to safety of operations and continuation of the programs.

DND/CAF Response (April 2020): “The efforts towards recapitalization of the Suffield Chemical and Biological Laboratories (Recap) are continuing, with the ‘Identification’ and ‘Options Analysis’ phases occurring to develop a Statement of Requirements and cost estimation, respectively. This is planned to occur over a 24-month period beginning in Fall 2020. Both of these will result in the selection of a course of action for the ‘Design’ phase. Additionally, a site for the new facility has been selected and approved. With Recap now advanced, its timeline is converging with that anticipated for the Modular Bio Containment Facility (MBCF). As such, options for coordinating the two efforts are currently under consideration.”

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BCDRC Comment (December 2020): This year, we were told that the separate MBCF project has been side-lined in favour of building the new laboratory complex, possibly in stages. The rationale for this change is that the planned completion date for the two projects has been converging with the MBCF due to be commissioned only a few years before the larger project. The new, unified endeavour is titled the Laboratory Modernization Project. A modified site has been selected and contracts for preliminary studies (environmental impact, topographic, geophysical, etc.) have been awarded. Current estimated cost is \$275-350M with occupancy anticipated to occur within 12-15 years. Given this timeline, contingency plans for catastrophic failure of the existing infrastructure are apparently being developed. We will be interested to learn more about these plans as we believe that it is likely the aging biocontainment facility will fail before the modernization project is completed. The lack of a such a facility at SRC, even temporarily, would jeopardize Canada's ability to meet its domestic responsibilities and international commitments.

DND/CAF Response (April 2021): "The efforts towards the Modernize Chemical and Biological Research Laboratories DRDC Suffield project are continuing. The 'Identification' and 'Options Analysis' phases to develop a Statement of Requirements and cost estimation, respectively, are planned over a 24-month period via contract which has been awarded. The contractor that will carry out this work is currently completing the security process. Both phases will result in the selection of a course of action for the 'Design' phase. The Modular Bio Containment Facility (MBCF) project is currently on hold since the Modernize project is making progress. Both projects draw on the same scientific staff. Their timelines are converging and their commissioning is expected to be a few months apart. The Independent Review Panel for Defence Acquisition (IRPDA) provided advice on the 'Modernize' project, which resulted in bolstering the project documents with a better description of the capability gaps. The Panel also emphasized the urgency of moving this project forward with an accelerated timeline, if possible."

Status: OPEN

2. (2016) *A comprehensive assessment of Suffield Research Centre's unique occupational health and emergency medical support needs should be conducted under the leadership of DRDC in order to identify gaps and to design and implement long terms solutions involving relevant stakeholders. [This recommendation has been reworded to reflect the situation in 2019]*

DND/CAF Response (April 2017): "As the national authority responsible for the oversight and provision of direction related to the compliance, control, and risk management of CBRN S&T activities, the Chief of Staff (Science and Technology) will undertake an assessment of Suffield Research Centre's occupational health and emergency support needs during Fiscal Year 17/18. The assessment will be designed to engage all relevant stakeholders in identifying any potential gaps and providing options to address them."

BCDRC Comment (December 2017): We look forward to learning of the outcome of this assessment during our next visits to SRC and the DRDC Corporate Office.

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DND/CAF Response (April 2018): “The Health and Safety Management System (HSMS) at Suffield Research Centre is comprised of an overarching Health and Safety manual with annexes for each safety area, including chemical and biological safety. The HSMS is reviewed on a bi-annual basis and is currently under review by relevant Section Heads and safety staff. In addition, the Suffield Research Centre has established a more comprehensive Integrated Emergency Response Plan, involving the Base Medical Centre and the CFB Suffield Fire Department. To reflect this, modifications to the current Service Level Agreements (SLA) are taking place. Further, the Suffield Research Centre has a scheduled audit of its entire safety system for later in 2018. Moving forward, there is an initiative to examine the feasibility of integrating the HSMS into the framework of our Environmental Management System. Over the last years, significant internal efforts have been made to establish a more integrated H&S Program, indicating that a comprehensive review via an external organization may not be needed. However, once the current HSMS review and safety audit are complete, the Suffield Research Centre will re-evaluate the need to conduct any additional reviews.

BCDRC Comment (December 2018): As stated in our 2018 report, the occupational health and emergency medical support situation has improved substantially over the past year. Nevertheless, the Committee believes that a comprehensive assessment is still merited in order to stabilize and sustain appropriate occupational health and medical support programmes and systems for the future. It may be that the current Health and Safety Management System Review will achieve the same goal. As such, we will ask for a report on the Review’s results during our 2019 visit to SRC, after which we will revisit this recommendation.

DND/CAF Response (February 2019)

“Notes from DRDC Suffield:

The Health and Safety Management System (HSMS) at Suffield Research Centre is comprised of an overarching Health and Safety manual with annexes for each safety area, including chemical and biological safety. The HSMS is reviewed on a bi-annual basis and is currently under review by relevant Section Heads and safety staff.

The Suffield Research Centre has established a more comprehensive Integrated Emergency Response Plan, involving the CFB Suffield Medical Centre, the CFB Suffield Fire Department, CFB Suffield Military Police, and Alberta Health Services. To reflect this, modifications to the current Service Level Agreements are taking place. Indeed, a comprehensive Integrated Emergency Response Exercise (IERE) organized by DRDC Suffield and conducted at CFB Suffield on September 5, 2018 demonstrated the cooperation by DRDC Suffield to bring relevant stakeholders together, including DRDC Suffield, CFB Suffield Fire Department, CFB Suffield Field Ambulance, CFB Suffield Military Police, Medics from the British Army Training Unit Suffield (BATUS), and Alberta Health Services, to successfully complete one of the most advanced emergency exercise cross the agency [*sic*]. Any news of the IERE was posted on the Government Canada website by ADM Public Affairs on September 7, 2018 (<https://www.canada.ca/en/department-national-defence/news/2018/09/successful-integrated-emergency-response-exercise>

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[conducted-at-cfb-suffield.html](#)). Further, the Suffield Research Centre has an external audit of its entire safety system scheduled for Fall 2019. Moving forward, there is an initiative to examine the feasibility of integrating the HSMS into the framework of our Environmental Management System.

Over the last several years, significant internal efforts have been made to establish a more integrated H&S Program at the Suffield Research Centre which is consistent with ADM (S&T)'s Environment, Health and Safety Policy, indicating that a comprehensive review via an external audit organization may not be needed. However, once the current HSMS review and safety external audit are complete, the Suffield Research Centre will re-evaluate the need to conduct any additional reviews.

Notes from Canadian Forces Health Services:

Not related to Canadian Forces Health Services. Canadian Forces Health Services would participate in a comprehensive review but are not the primary stakeholder.”

BCDRC Comment (December 2019): Notwithstanding that this recommendation *per se* has not been acted upon, we have noted, as recorded in last year's report, several substantial and enduring improvements commendably effected locally by SRC, CFB Suffield and others with the support of regional and national level authorities. Foremost amongst these was the engagement of a Medical Advisor by SRC. Consequently, our major concerns have been alleviated – at least temporarily. We maintain, however, that the components of an occupational health programme and an emergency medical response capability that meet the needs of SRC (and which already exist in large measure) should be locally defined, integrated and incorporated in a tool such as the existing SRC Risk Management Framework and their status monitored. Moreover, where appropriate, these components should be cemented in place by officially promulgated policy or formal agreements between parties including non-DND or CAF parties. As soon as the first of these steps is completed, the Committee would be inclined to close the recommendation as having been superseded by other actions.

DND/CAF Response (April 2020): “The Health & Safety Management System (HSMS) Manual has been completed and is available to all Suffield Research Centre (SRC) staff. This is an overarching document describing the various elements of the SRC Health and Safety Program as well as their interdependencies; it was designed to meet the CAN/CSA OHSAS 18001:07 Standard (ISO 45001:2018 equivalent) for health and safety management best practice. Additionally, an external audit was performed in September 2019 on the Safety and Environmental Management System (SEMS) and went very smoothly; the report is currently in draft and SRC is awaiting its release to review and implement any recommended actions. Further, a job hazard analysis was initiated in September 2019, with the data collection completed by a scientist from the Defence Research and Development Canada Toronto Research Centre. The data are now with a contractor for analysis. The Integrated Emergency Response Plan (IERP) is also complete, including emergency response plans for a variety of incidents. CF Health Services will continue to support SRC's occupational health and emergency medical support needs. DND/CAF considers this recommendation completed.”

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BCDRC Comment (December 2020): While acknowledging these important actions, we continue to believe that the components of an occupational health program and an emergency medical response capability that meet the needs of SRC (and which already exist in large measure) should be locally defined, integrated, and incorporated in a tool such as the existing SRC Risk Management Framework and their status monitored with a view to quickly flagging to management the re-emergence of deficiencies. Moreover, where appropriate, these components should be cemented in place by officially promulgated policy or formal agreements between parties including non-DND or non-CAF parties to avoid slippage and dependence on specific personal relationships. As soon as the first of these steps is completed, the Committee would be inclined to close this recommendation as having been superseded by other actions.

DND/CAF Response (April 2021): “The Health & Safety Management System (HSMS) Manual has been completed and is available to all Suffield Research Centre (SRC) staff. This is an overarching document describing the various elements of the SRC Health and Safety Program as well as their interdependencies; it was designed to meet the CAN/CSA OHSAS 18001:07 Standard (ISO 45001:2018 equivalent) for health and safety management best practice. Additionally, an external audit was performed in September 2019 on the Safety and Environmental Management System and went very smoothly; the report is currently in draft and SRC continues to wait for its release to review and implement any recommended actions. Further, a job hazard analysis was initiated in September 2019, with the data collection completed by a scientist from the DRDC Toronto Research Centre. The analysis of the collected data continues and a final report is expected. The Integrated Emergency Response Plan is also complete, including emergency response plans for a variety of incidents.

The SRC Risk Management Framework was discussed at some length during the virtual visit with BCDRC in September 2020, and the intent behind this portion of Recommendation 2 was clarified. This Framework is in the process of being updated based on this discussion; however, a completion date cannot be provided at this time for two reasons: 1) it relies on updating other tracking systems (e.g., a list of current SOPs and their revision history); and 2) a shortage of personnel.

With regards to emergency medical support, SRC continues to rely on the Base Medical Centre for emergency response to any chemical exposure and on our contracted Medical Advisor along with public health for other types of exposures and incidents. In Fall 2020, the Base Surgeon was posted out and the incoming Base Surgeon arrived. Due to COVID-19, neither of the usual CBRN courses (US and UK CBRN courses) were available to the incoming Base Surgeon. To mitigate this, DRDC SRC and the outgoing Base Surgeon designed and executed a 1-week CBRN Clinical Course which was also offered to other CAF medical staff. The course was well received and there are ongoing discussions to make it a regular offering.”

Status: OPEN

- 3. (2017) *Given the unique and essential capability of the Central Medical Equipment Depot, the operational importance of its gaining Good Manufacturing Practice accreditation;***

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and, the potential value of collaboration with the Public Health Agency of Canada; consideration should be given to the replacement and relocation of this facility with a view to overcoming the shortfalls and impediments posed by its current state and location.

DND/CAF Response (April 2018): “CF H Svcs Gp appreciates that BCDRC is emphasizing this in its report and fully agrees with this recommendation. The current condition, capacity and location of the CMED facility poses several risks to the ongoing management of our medical stockpile.

A Good Manufacturing Practices-compliant (GMP) facility and a Health Canada issued Establishment License are essential to ensuring the quality of the various medical products that the Group imports, stores, distributes and potentially shares with other government departments and allied partners. A licensed facility, with a robust quality assurance system in place should minimize the risk of operationally essential medical resources becoming compromised.

A strategic level partnership between CF H Svcs Gp and PHAC has recently been formalized between the Surgeon General and the VP of Health Security Infrastructure Branch at PHAC. Ongoing efforts will be applied to exploring short term solutions while scoping an ongoing collaborative partnership that would be focused on common infrastructure requirements and coordinated inventory management and procurement.

CMED replacement has been identified as a requirement and has been included in the DND infrastructure plan. However, given the current prioritization of the project, we anticipate that it will be at least ten years before the facilities are replaced and relocated. CF H Svcs must accept and manage these risks but our ability to mitigate them remains limited. Although our strengthened partnership with PHAC may introduce other risk mitigation opportunities, the limitations of the current CMED facility may prevent a full realization of the benefits of this partnership. The ideal solution to the problem would be an acceleration of the approval and funding of this project and early efforts are taking place to elevate its position on the departmental prioritization list.”

BCDRC Comment (December 2018): We are encouraged by the support voiced for this recommendation by CFHS Gp HQ and other NDHQ authorities. CMED replacement is now identified as a requirement and is included as priority 32 of 144 departmental infrastructure projects. Notwithstanding this placement, construction is many years off. In the meantime, we commend the Group’s intention to continue to strengthen its partnership with PHAC, and, in so doing, to look for opportunities to mitigate some of the risks associated with CMED’s current situation. We will closely monitor developments beginning with our next visit to CMED in 2019.

DND/CAF Response (February 2019)

“Notes from Canadian Forces Health Services:

Canadian Forces Health Services Group (CF H Svcs Gp) appreciates that BCDRC is emphasizing this in its report and fully agrees with this recommendation. The current condition, capacity, and location of the CMED facility poses several risks to the ongoing

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management of our medical stockpile. A Good Manufacturing Practices-compliant (GMP) facility and a Health Canada issued Establishment License are essential to ensuring the quality of the various medical products that the Group imports, stores, distributes and potentially shares with other Government departments and allied partners. A licensed facility, with a robust quality assurance system in place should minimise the risk of operationally essential medical resources being compromised.

A strategic level partnership between CF H Svcs Gp and PHAC has recently been formalized between the Surgeon General and the VP of Health Security Infrastructure Branch at PHAC. Ongoing efforts will be applied to exploring short term solutions while scope an ongoing collaborative partnership that would be focused on common infrastructure requirements and coordinated inventory management and procurement.

CMED replacement has been identified as a requirement and has been included in the DND infrastructure plan. However, given the current prioritization of the project, we anticipate that it will be at least ten years before the facilities are replaced and relocated. CF H Svcs Gp must accept and manage these risks but our ability to mitigate them remains limited. Although our strengthened partnership with PHAC may introduce other risk mitigation opportunities, the limitations of the current CMED facility prevent a full realization of the benefits of this partnership. The ideal solution to the problem would be an acceleration of the approval and funding of this project and early efforts are taking place to elevate its position on the departmental prioritization list.

In November 18, a briefing note was sent to ADM (IE) requesting approval to engage in a strategic infrastructure collaboration between DND and the Public Health Agency of Canada (PHAC) on a shared medical warehouse on CFB Trenton. This project continues to be 35th on the priority list for ADM (IE) and 3rd for Military Personnel Command's infrastructure requirements. The importance of this project to CF H Svcs and the CAF will continue to be emphasized."

BCDRC Comment (December 2019): Renovations to mitigate the shortfalls of the existing facility continue including a proposal to construct a GMP certifiable room to permit exchange of products with PHAC. We encourage expedient funding of this proposal.

DND/CAF Response (April 2020): "The replacement of the Central Medical Equipment Depot (CMED) continues to be a high priority for the CF Health Services. A number of joint activities between CF Health Services and the Public Health Agency of Canada have occurred in support of the new CMED facility. Site options in Trenton have been developed and are pending final review. Overall, good progress has occurred in the project to construct a new CMED facility."

BCDRC Comment (December 2020) We remain strong in our support of the need to replace and relocate the CMED, but understand this may not occur for many years – the project being 35th on the relevant list of CAF infrastructure priorities. In the meantime, we are happy that renovations to bring the laboratory room up to GMP standards are underway. We commend the efforts of CFHS Group to address the risk to which this situation gives rise and hope that the current heightened public awareness of the

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importance of appropriate medical equipment and pharmaceutical supply and distribution facilities will be of benefit in this connection.

DND/CAF Response (April 2021): “Initial design requirements developed in 2018 delineated the need for the facility to be compliant with current Good Manufacturing Practices as described in GUI-0069 Health Canada Guideline. The project staff have been engaged in the identification of potential siting locations, and are currently working with DND Real Property Managers as to the footprint best suited to the facilities’ requirements. However, completion of the project depends on where it figures on the list of Departmental priorities and availability of funds. DND is maintaining engagement with the Public Health Agency of Canada (PHAC) about possible collaboration with the construction of this facility that could serve both organisations’ purposes. Of note, renovations are nearing completion on the CMED laboratory room with temperature mapping scheduled for February 2021 and again in summer 2021. It will be used as an interim approach while the capital project for a new facility continues to progress through the DND project process.”

Status: OPEN

- 4. (2019) *To ensure that staff handling agent achieve a consistent level of skill and confidence in order to operate safely, the AWC framework should be verified and thereafter continuously maintained and updated under document control.***

DND/CAF Response (April 2020): “The Agent Worker Certification (AWC) framework was established and first implemented with existing senior staff in the chemical defence program. One of the most challenging issues facing the AWC process is the relatively small size of the Canadian chemical defence program, and work with chemical warfare agents, or other emerging threat agents, which does not occur on a daily basis. In fact, it is not unusual for several weeks to pass without any activities involving agent handling. In the past three years a number of new staff have been hired and introduced to the AWC process and are currently at various stages in their training. As the new personnel began to move through the various levels of the AWC program it became evident that infrequent agent handling opportunities and different degrees of laboratory experience and skill-sets within the new hires necessitated a more flexible application of the AWC process. Many of the current challenges only became evident as the new staff started their AWC training. The AWC framework is being reviewed and verified against the requirements to prepare new staff to work safely with chemical warfare agents. A final version will be produced in 2020 and complete document/version control will be put in place.”

BCDRC Comment (December 2020): This year, we learned that a team comprising scientists and technologists has reviewed the AWC program and made a number of proposals aimed at eliminating logic gaps, simplifying structure, distinguishing between assessors and mentors, providing for recertification of graduates when required and making the Chemical Safety Officer responsible for program documentation control. These proposals have been accepted and are being implemented. We also understand

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that the program will be reviewed again in two years' time to ensure it remains fit for purpose. As such, the Committee will close our 2019 recommendation as having been implemented.

DND/CAF Comment (April 2021): The Agent Worker Certification (AWC) framework was established in 2015 and first implemented with existing senior staff in the chemical defence program. Since then there has been an opportunity to pilot the framework with new staff and generate improvements. There have now been substantial revisions to the AWC program. A new version of the framework is currently under review. This iteration of the framework was largely the product of an agent handler driven review, where lessons learned from training new staff have been incorporated into a streamlined and clarified document for staff training. Additionally, two parallel documents on the training of emergency response team members (for research) and chemical training safety officers are being drafted. Together, these documents will clearly outline the training requirements for a new agent handler as well as clearly define their roles as a laboratory worker, a training officer, and a member of the emergency response team. The changes proposed in the document include new levels for agent handling and, therefore, staff that are already certified will be grandfathered into the appropriate "new" level and the changes documented.

As of January 2020, the acetylcholinesterase (AChE) monitoring program has been implemented on a mandatory basis for all chemical warfare agent (CWA) handlers at SRC. Trained custodians in every Section where work with CWA is conducted perform analyses of worker blood samples, first to establish an individual baseline and then to monitor staff's AChE levels after agent handling activities. A revision to the original SOP, which introduces a new electronic record keeping system, is underway. It allows for the confidential storage of test data for every individual, as well as easy access for the SRC Medical Advisor in the event of an emergency.

Status: CLOSE

5. (2019) *Authoritative information on the management of incidents involving unique risk factors at Suffield should be provided to first responders such that they may effectively and safely operate during an emergency.*

DND/CAF Response (April 2020): "A Suffield Research Centre (SRC) document on safety advice and guidance for DND/CAF personnel and operators regarding nerve agents is being drafted for publication. The intent of this guide is to provide DND/CAF personnel with the most up-to-date knowledge of highly toxic nerve agents and special considerations for responding to and managing incidents where they may be involved. Once published, it could then be provided to emergency personnel and stakeholders responsible for incidence response at CFB Suffield should the need arise to inform decision making on hazard assessment and exposure routes; toxicity, symptoms and health monitoring; detection and identification; protection, contamination control; decontamination and casualty management; and medical treatment. The document is expected to be published in June 2020."

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BCDRC Comment (December 2020): We understand that due to the impact of the COVID 19 pandemic, publication of this document has been delayed. We look forward to notification of its release to relevant DND/CAF personnel.

DND/CAF Comment (April 2021): A SRC document on safety advice and guidance for DND/CAF personnel and operators regarding nerve agents will soon be published. The intent of this guide is to provide DND/CAF personnel with the most up-to-date knowledge of highly toxic nerve agents and special considerations for responding to and managing incidents where they may be involved. Once published, it could then be provided to emergency personnel and stakeholders responsible for incidence response at CFB Suffield should the need arise to inform decision making on hazard assessment and exposure routes; toxicity, symptoms and health monitoring; detection and identification; protection, contamination control; decontamination and casualty management; and medical treatment. The actions needed to close out this recommendation were delayed by the SRC response to COVID-19 but will be completed during fiscal year 2021-22.

Status: OPEN

6. (2019) DRDC senior leadership should take action to ensure that an appropriate succession plan is in place to address the turnover of personnel in critical positions at SRC.

DND/CAF Response (April 2020): “The DRDC Director General Science & Engineering has developed and implemented a multi-phase succession plan, which commenced in July 2019. All forecasted retirements at Suffield Research Centre have been reviewed and approved for replacement, with inclusion of a hand-over period for those positions with unique and critical knowledge and skillsets (e.g., Bio-Safety Officer).”

BCDRC Comment (December 2020) We credit DRDC for its effective initial response to this recommendation. This said, we are led to believe that there remains some turbulence around the replacement of the head of the Chemical Synthesis and Characteristics Group, which is a crucial, one-of-a-kind position. More generally speaking, we acknowledge that keeping the research and development sections at SRC fully staffed is a perpetual challenge given the specialized skills and knowledge required and the relative remoteness of the location. As such, section heads spoke of the value they attach to the increasing understanding and support of corporate human resources authorities. We also heard appreciation expressed for recent success in securing new corporate services positions or filling vacancies locally. We hope to see more evidence of such effective collaboration during our next visit at which point we may be prepared to close this recommendation as having been implemented.

DND/CAF Response (April 2021): “The ADM (DRDC), the Chief of Staff (DRDC), and DRDC Director General Science & Engineering continue to maintain a multi-phase succession plan. All forecasted retirements at Suffield Research Centre have been reviewed and approved for replacement, with inclusion of a hand-over period for those positions with unique and critical knowledge and skillsets (e.g. Safety Officers). While some positions have been filled, it remains difficult to hire people into positions that require extensive knowledge and/or expertise – likely due to the more remote location of SRC. There have

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also been delays in issuing Letters of Offer due to the lengthy process and time required to issue security clearances to new employees. Additionally, the high vacancy rate for Chemical Biological-related capabilities has caused the workload of those remaining to increase, thereby reducing the amount of staff available to perform hiring functions.”

Status: OPEN

7. (2020) *The terms of reference, composition and operation of the Chemical Safety Committee at the Suffield Research Centre should be reviewed and, if necessary, modified to ensure that it effectively contributes to the maintenance of a safe workplace.*

DND/CAF Response (April 2021): “The Terms of Reference and membership have been formally updated and approved as of 21 October 2020. The changes to the membership included the addition of a toxicology advisor, a hazardous materials advisor, and a member external to the sections that undertake CWA research. The Terms of Reference were focused such that the Chemical Safety Committee can concentrate on matters referred by the General Safety and Health committee and on the review of Standard Operating Procedures and Online Turbo Application Proposals, a SRC tool that provides safety oversight to research and field trials. The meeting schedule was made more frequent in an effort to address some of the long-standing items on the Committee’s agenda.”

Status: OPEN

ACRONYMS AND ABBREVIATIONS

AChE – acetylcholinesterase

ADM DRDC - Assistant Deputy Minister – Defence Research and Development Canada

ADM IE – Assistant Deputy Minister – Infrastructure and Environment

AWC – Agent Worker Certification

BATUS – British Army Training Unit Suffield

BCD - Biological and Chemical Defence

BCDRC - Biological and Chemical Defence Review Committee

BCW – Biological and Chemical Warfare

BTWC - Biological and Toxin Weapons Convention

BWTMCM - Biological Warfare Threat Medical Countermeasures

CAF - Canadian Armed Forces

CBRN - chemical, biological, radiological and nuclear

CBRNE - chemical, biological, radiological, nuclear and explosive

CFB - Canadian Forces Base

CFFCA - Canadian Forces Firefighting and CBRN Academy

CFHS Group – Canadian Forces Health Services Group

CFHS Group HQ - Canadian Forces Health Services Group Headquarters

COLPRO – Collective Protection

CMED - Central Medical Equipment Depot

CNSSSF - Canadian National Single Small-scale Facility

CTTC - Counter Terrorism Technology Centre

CWC - Chemical Weapons Convention

DAOD - Defence Administrative Order and Directive

DND - Department of National Defence

DRDC - Defence Research and Development Canada

DURC – Dual Use Research of Concern

EPG - Experimental Proving Ground

FY - fiscal year

GAC – Global Affairs Canada

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GLP – Good Laboratory Practice

GMP – Good Manufacturing Practice

GSO – General Safety Officer

MBCF – Modular Biological Containment Facility

MCM - medical countermeasures

NATO – North Atlantic Treaty Organization

NDHQ - National Defence Headquarters

ONTAP - On-line Turbo Approval Process

OPCW - Organization for the Prohibition of Chemical Weapons

PAO – Plan for Administrative Oversight

PHAC - Public Health Agency of Canada

PAO – Plan for Administrative Oversight

S&T - science and technology

SLA - Service Level Agreement

SRC – Suffield Research Centre