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Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) Formative Evaluation

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CAVEAT

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SYNOPSIS

The Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) is a five-year initiative launched in May 2002 to enhance Canada's capacity to deal with potential CBRN terrorist threats to public security. The objective of the formative evaluation is to assess the degree to which the program has achieved its overall mandate and other key program objectives and, in addition, to provide recommendations in preparation for CRTI renewal.

CRTI is well respected within and outside the federal science and technology community for its innovative approach and overall thoughtful leadership. Its existence has created recognition and awareness with respect to a critical requirement and, in a relatively short period of time, it has become a focal point for CBRN science and technology response. Key findings include:

- *CRTI governance structure is effective and does support the achievement of program-mandated activities. Program activities have proceeded as planned with the expected impact in most areas, and some areas for improvement have been provided.*
- *CRTI has met its mandate and the needs of stakeholders in a relatively effective and efficient manner.*
- *Funded activities around the project portfolio have proceeded as planned. CRTI-funded exercises have been very well received and are considered as one of the best ways to test operational response capability. Communications and knowledge management is well done with particular recognition given to the annual summer symposium.*
- *Laboratory Clusters have achieved significant successes with respect to the establishment of networks, increased awareness of lab expertise and capabilities, conduct of technology acquisition projects, and varying levels of success with respect to other roles and activities. These successes have contributed to the overall CRTI mandate and objectives.*

The formative evaluation provides recommendations in five key areas as follows:

- *Continue to pursue the capability-based planning approach with particular attention to clarification and definition of what this approach entails and development/integration into the CRTI governance framework and operational model.*
- *CRTI governance framework needs to be clarified in five areas, namely: relationships with national-level response framework and authorities; Lab Cluster objectives, roles and responsibilities; CRTI Memorandum of Understanding; CRTI documentation; and outcomes tracking and management.*
- *Greater exploitation of CRTI project results in order to establish an environment for "technology pull" from operational communities.*
- *Sustainment of CBRN-related expertise/knowledge and equipment post-project implementation.*
- *Revise the CRTI Communications Strategy and Plan to develop and implement a broader communications strategy and plan that targets a wider audience.*

RESULTS IN BRIEF

INTRODUCTION

The Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) formative evaluation was conducted over a period of approximately 20 weeks (January 16 to May 31, 2006 inclusive).

BACKGROUND

CRTI was launched in May 2002 as the federal science community's response to providing science solutions to CBRN terrorist threats. It was created as a $170M, five-year initiative to significantly enhance Canada's capacity to deal with potential CBRN threats to public security, and is part of the overall $7.7B Public Security and Anti-Terrorism (PSAT) package announced by the Canadian government in Budget 2001. CRTI is a horizontal program led by Defence Research and Development Canada (DRDC) of the Department of National Defence (DND), and coordinated by an interdepartmental Steering Committee (SC) representing the Privy Council Office and 17 participating departments and agencies within the Canadian government.

The CRTI mandate is to strengthen Canada's preparedness for, prevention of, and response to potential CBRN attacks by fostering new investments in research and technology. CRTI facilitates the use of resulting knowledge and technology by managing key activities, and leading and coordinating collaboration and exercises both within Canada and internationally.

Since implementation, the CRTI Program has developed the Consolidated Risk Assessment (CRA); initiated and conducted project activities; created and expanded laboratory clusters; and engaged the federal science and technology (S&T) community and other S&T stakeholders. The CRA enabled CRTI to identify S&T capability gaps and to prioritize responses. The conduct of projects has provided a vehicle to accelerate technology to operational communities and to increase CBRN S&T knowledge and, in the process, has engaged S&T stakeholders. The creation and follow-on work of laboratory clusters has focused the efforts of the laboratory networks. It has also facilitated the dialogue and discussion in the federal community, and has helped to focus on the joint needs of scientific labs and the operational community required to address potential CBRN terrorist attacks.

Fiscal year (FY) 2006/07 represents the last year of funding under the original CRTI. In the Framework document, CRTI undertook to make available a comprehensive program evaluation before CRTI renewal would be requested.

DND's Chief Review Services (CRS) asked Fujitsu Consulting to conduct this CRTI formative evaluation, which will position leaders of the CRTI Program to assess program performance to date and to identify areas for improvement going forward.

EVALUATION OBJECTIVE

The objectives of the formative evaluation are to conduct a detailed evaluation of CRTI and to assess the degree to which CRTI has achieved its overall mandate and other key program objectives.

CRITICAL SUCCESS FACTORS FOR THE CONDUCT OF THE EVALUATION

Critical success factors for evaluation success were identified in the CRTI Program Evaluation Plan, as follows:

- Senior management support and direction for the conduct of the formative evaluation;
- Availability of background documentation and sufficient time for Fujitsu Consulting read-in;
- Early communication/notification to evaluation participants and stakeholders is provided;
- Availability of identified CRTI participants and stakeholders in interview sessions and active participation;
- Availability of identified CRTI participants and stakeholders in workshop sessions and active participation; and
- CRTI SC member participation in the results validation working session.

In general, the critical success factors were met and this contributed to the ability of evaluators to successfully conduct the evaluation. There was one exception: ***due to security requirements, access to the Consolidated Risk Assessment and Operational Gaps documents was not possible. This proved to be a significant limitation for discussions and analysis that was not indicated in the initial Statement of Requirement***.

OVERALL ASSESSMENT

CRTI is well respected within and outside the federal S&T community for its innovative approach and overall thought leadership. Its existence has created recognition and awareness with respect to a critical requirement and, in a relatively short period of time, it has become a focal point for CBRN S&T response.

CRTI is meeting its mandate as demonstrated in a number of areas including the effective selection, conduct and oversight of projects (technology acquisition projects, technology acceleration projects and research and development (R&D) projects); the effective building of the federal S&T network and other Canadian and international relationships; successful responses to non-CBRN events (e.g., SARS); and performance on CRTI-sponsored exercises. In addition, program activities have proceeded as planned with the expected impact in some areas and less so in others. Specific areas of opportunity for increasing effectiveness and efficiency are identified throughout the balance of this report. These areas will require further review, development and refinement going forward.

CRTI's success to date is attributed, but not limited, to a well-structured and tightly run program, a balanced project portfolio, and dedicated and engaged S&T community. In addition, successful partnership initiatives with international S&T and security communities have also expanded its influence and recognition in a relatively short period of time.

It is also important to remain cognizant of the challenges and issues that are outside CRTI's direct control, but nevertheless impact the overall contribution of the program to a Canadian CBRN response strategy that is still maturing. Mitigation strategies for CRTI such as helping to facilitate solutions in these areas will help to ease these impacts. As well, clarification of the limits of the CRTI mandate and scope of activity, both within and outside the S&T community, will help to frame realistic expectations, facilitate an accurate assessment of national CBRN response capability/capacity and contribute to the development of a national response strategy and plan.

Input from interviewees has presented overwhelming support for CRTI as necessary and critically important; however, there is also widespread opinion/belief that the program needs to evolve its overall approach. One approach under consideration is capability-based planning (CBP) which implies a broader response focus. Regardless of the approach that is ultimately chosen, the CRTI role needs to be clearly stated and include what is within its scope and what is not within its scope.

Finally, it is important to note that expectations regarding what CRTI could or will deliver have changed over time. Going forward, regardless of the approach selected, there needs to be a re-set or check point with stakeholders in order to ensure that there is consistent understanding of the CRTI mandate with clear expectations and objectives.

MAIN RECOMMENDATIONS

In order for CRTI to continue to strengthen Canada's preparedness for, prevention of, and response to a CBRN terrorist attack through investments in S&T, initiatives are recommended in five key areas. The first is that CRTI continue to pursue the capability-based response approach that is currently under development. It is further recommended that CRTI pursue initiatives to directly address and/or influence another four key areas in the short to mid-term (i.e., up to six months) or longer in one case (6 mo.+).

- Integration of **capability-based response** to guide CRTI activities and decision making—CRTI is proposing a shift from the present capacity-based response planning to CBP to resolve strategic issues. The components of this initiative include:
  - Define what capability-based response and planning is, and identify how it impacts CRTI outcomes and CRTI's contribution to the national security objectives and outcomes;
  - Identify the impacts on CRTI governance and operational model, and enact the appropriate changes; and
  - Develop and implement an engagement model to involve provincial, territorial and municipal (P/T/M) jurisdictions and operational communities in both Cluster and Project activities.

- CRTI **governance—**some refinement of program governance elements will significantly contribute to overall effectiveness and efficiency. Five proposed areas include: building on CRTI relationships within the national-level response framework and with national authorities and stakeholders; reviewing and rationalizing Lab Clusters' objectives, roles, and responsibilities; an amendment to the CRTI MOU to include Lab Cluster activities; clarifying CRTI documentation and lexicon; and the introduction of a formal outcomes tracking and management framework. The objective is to strengthen CRTI governance to meet identified issues/challenges, provide increased effectiveness and efficiency, and position CRTI to demonstrate its overall contribution to national security strategic objectives.
- Greater exploitation of CRTI project results—the objective is to establish an environment for "technology pull" from the operational communities. By understanding operational response gaps from the operational community perspective, CRTI will be better able to target its activities (e.g., identify S&T gaps, selection of projects, conduct of exercises) and meet end-user needs.
- Sustainment of expertise, knowledge and equipment post-project implementation—the objective is to maintain the longer-term capability and capacity for Canada to respond to CBRN terrorist events. Sustainment of response capability and capacity is required in three specific areas: retention of project personnel; retention of S&T knowledge within departments; and operations and maintenance of new technology. The long-term strategies and plans of departments and operational communities must be coordinated with CRTI activities such that CRTI funding is used to increase capability and that new knowledge, skills and technology are retained. This will ensure that S&T, through CRTI investments, will contribute maximum value to the national security strategic objectives.
- Revise the CRTI Communications Strategy and Plan—the objective is to develop and implement a broader communications strategy and plan that targets a wider variety of audiences. The plan should target setting and maintaining stakeholder focus and expectations regarding CRTI, raising awareness in other communities outside the federal S&T community, and supporting the engagement strategy to obtain buy-in and participation of those communities.

MANAGEMENT ACTION PLAN

Serial	CRS RECOMMENDATION	OPI	MANAGEMENT ACTION
1	**Governance:** **1.** Clarify CRTI inter-relationships with national-level response framework & authorities. **2.** CRTI Secretariat undertake a review and assessment of Lab Cluster roles, responsibilities and expected outcomes in accordance with the required work effort, resources and timelines to achieve the expected outcomes. **3.** CRTI SC and Secretariat develop and implement a strategy to ensure member departments and agencies commitment to the CRTI and to Lab Cluster activities. **4.** CRTI Secretariat review its program documentation (e.g., MOU, Framework, RMAF, and Call for Proposal Guidebook) with the objective of establishing clarity and discipline of terminology and lexicon. **5.** CRTI Secretariat establish an outcomes tracking and management framework.	ADM(S&T)	1.1 A director-level working group will be formulated with Public Safety and Emergency Preparedness Canada (PSEPC) to outline a national-level inter-relationship framework within the context of the Centre for Security Science (CSS) (fall 2006). 1.2 Director General CSS and D/CRTI will meet with Cluster leaders and representatives to clarify and, if necessary, revise Laboratory Cluster roles, responsibilities and outcomes (fall 2006). 1.3 D/CRTI along with the Director of the Public Security Technical Program (D/PSTP) will undertake an outreach initiative to meet with SC members to engage and seek comments on Cluster plan developments (fall 2006). 1.4 Under the direction of knowledgeable CRTI program management staff, a technical writer will be engaged to review and compile documentation in advance of the next Call for Proposals (fall 2006). 1.5 CRTI management will re-evaluate the RMAF performance measures and will establish a performance measurement system (spring 2007).

Serial	CRS RECOMMENDATION	OPI	MANAGEMENT ACTION
2	**Project Results Exploitation:** **1.** CRTI SC and Secretariat develop a closer working relationship with operational communities, departments/agencies with operational roles and provincial, territorial and municipal authorities to identify their requirements for equipment and knowledge. **2.** CRTI Secretariat continue to engage stakeholders and work towards establishing and implementing standards and certification functions.	ADM(S&T)	2.1 CRTI Secretariat will establish a strategy for the exploitation of R&D by operational communities through engaging PSEPC in planning and through integrating exploitation management into project management (spring 2007). 2.2 CRTI Secretariat will engage the Systems Integration, Standards and Analysis section of the PSTP in developing an approach to the standards and certification function and diffuse the approach to the broader communities (e.g., Clusters) (spring 2007).
3	**Resource Sustainment:** **1.** CRTI SC members leverage their roles and networks to assist the Secretariat, Lab Clusters and member departments and agencies to facilitate discussions and assist in the development and implementation of a sustainment framework in three areas.	ADM(S&T)	3.1 CRTI Secretariat will assess the issues and opportunities for sustainment of S&T knowledge, personnel and facilities and present this to the SC in the context of capability-based planning (spring 2007).
4	**Communication Strategy & Plan:** **1.** CRTI Secretariat revise and implement a CRTI Communications Strategy and Plan that targets a wider variety of audiences.	ADM(S&T)	4.1 CRTI Secretariat will produce a Communications Strategy and Plan that holistically includes CRTI, PSTP and CSS (fall 2007). The technology writer will also be tasked to include within the Call of Proposals a lexicon and terminology section.
5	**Capability-Based Response & Planning:** **1.** CRTI shift from the present capacity-based response planning to capability-based planning.	ADM(S&T)	5.1 CRTI Secretariat will develop and define the concept of "capability-based planning" for the community, tools for developing the plan will be evaluated and the overall CRTI logic model will be re-evaluated in this context.

EVALUATION BACKGROUND

EVALUATION CONTEXT

The context for the CRTI formative evaluation is provided by the elements described below.

Evaluation Level of Focus—Strategic and Tactical

The evaluation was conducted at two levels: strategic and tactical. The strategic level focused on determining whether CRTI was meeting its mandate and progressing towards meeting its stated objectives and outcomes. The tactical level focused on how well the program was conducting all key activities, supporting the mandate and to what degree.

First and foremost, the level of focus was driven by six evaluation questions that were provided in the formative evaluation Statement of Work:

- What is the effectiveness of the governance structure vis-à-vis support to the objective of CRTI? Are there potential improvements?
- Is CRTI effective and efficient in meeting its mandate, meeting the needs of stakeholders and producing the intended results/impacts?
- Have funded activities proceeded as planned and produced the expected deliverables/impacts?
- Have developments in each CRTI activity contributed to the desired objectives? Do funded activities support the CRTI mandate and objectives?
- Identify lessons learned from the CRTI delivery model, including the partnering process. What do the parties consider to be best practices?
- How well have Lab Clusters and their associated activities contributed to their objectives and to the overall CRTI mandate?

In general, the gathering of information, analysis and findings/recommendations in regards to the first three questions enabled the evaluation team to make observations at the strategic level. The remainder of the evaluation questions enabled an evaluation at the tactical level. The level of detail for the evaluation was defined by the following factors:

- CRTI stakeholders selected for the interview sessions included CRTI Program Director, Lab Cluster Leads, Project Champions, Project Managers and CRTI Secretariat staff;
- Information regarding individual project details and results were not gathered; and
- Aggressive timelines established for the actual conduct of the formative evaluation.

CRTI and Timeframe for the Formative Evaluation

It is important to note from the outset that even though the CRTI has been in existence for over four years, this timeframe is relatively short given the typical duration of technology acceleration and R&D projects. As a result, some deliverables and impacts were not anticipated until well into fifth year of the initial five-year mandate. Within this context, it was still possible to identify areas of opportunity to increase CRTI efficiency and effectiveness.

The general review period covered by the CRTI formative evaluation is from program initiation in April and May timeframe of 2002 through to the end of FY 2004 and 2005. The evaluation end point was not strictly adhered to as some activities went beyond this end point.

CRTI Components

CRTI Mandate and Governance Framework

The CRTI mandate and governance framework, the latter of which is depicted at Figure 1, are considered to be key evaluation areas. This evaluation did not question the CRTI mandate per se. The evaluation focus of this area was how the mandate is achieved in terms of overall organizational structure, operational framework and processes, overall ability to achieve roles and responsibilities in an effective and efficient manner and an assessment of impact on business outcomes. A secondary focus was on inter-relationships and dependencies with departments and agencies having specific CBRN response roles and mandates. The CRTI was also reviewed in regards to the initial absence of a mature Canadian CBRN response strategy.

Annex D includes the mandate and governance-related documents that were reviewed and assessed.

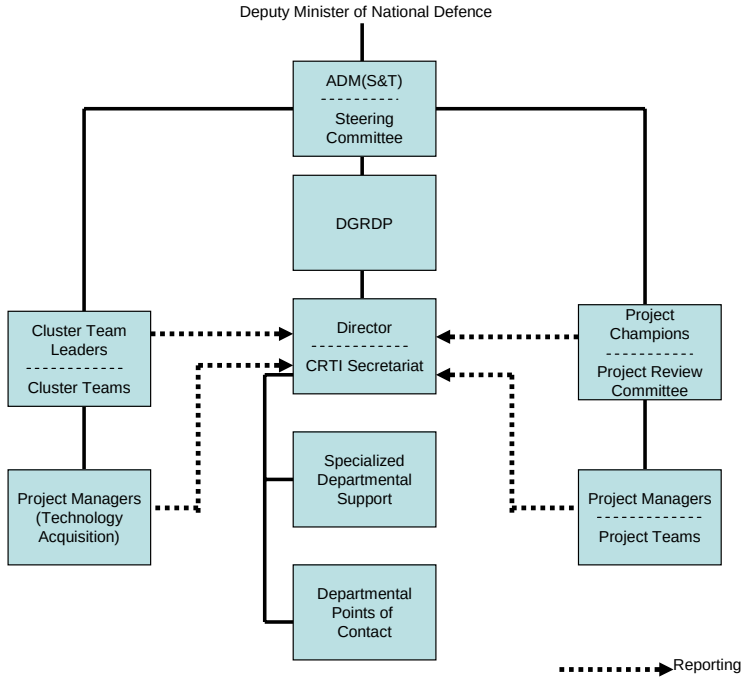

Figure 1—CRTI Governance Framework.

CRTI Operational Framework

The focus of this evaluation area was the management of all CRTI project-related activities with respect to the four categories of projects; namely, technology acquisition, technology acceleration, technology demonstration, and research and technology development.

Annex D includes the operational framework-related documents that were reviewed and assessed.

Laboratory Clusters

Four Lab Clusters (Biological Cluster, Chemical Cluster, Radiological/Nuclear Cluster, and Forensic Cluster) were established as free-flowing networks of federal and other government S&T laboratories with limited authority and controls. They were established to contribute synergistically, effectively and efficiently to the preparedness for, prevention of and response to a terrorist attack in Canada that has employed CBRN hazards. In the event of a CBRN terrorist attack, federal department and agencies would exercise their mandates where and as appropriate. Lab Cluster(s) would be engaged where requested, under direction of the mandated federal operational authority. Lab Cluster(s) would enable the authority to respond more effectively and efficiently by being able to draw on cross-departmental S&T capabilities and capacities available in the Cluster(s).

Annex D includes the Lab Cluster related documents that were reviewed and assessed.

CRTI Knowledge Management & Communications

Knowledge management, communications and community liaison are indicated as important components of CRTI and, therefore, the evaluation included a review of the associated areas and activities.

Annex D includes the related documents that were reviewed and assessed.

CRTI Ongoing Risks & Challenges

The external environment around CRTI is in a state of transition as national security objectives and plans are being more robustly articulated.

The evaluation team attempted to identify and bring attention to the risks and challenges that are beyond the direct control of CRTI, but which impact achievement of CRTI's objectives, as well the program's contribution to national security objectives.

Office of the Auditor General (OAG) April 2005 Report

The OAG April 2005 Report includes some specific references to CRTI within an overall CBRN response framework perspective and, to this end, the evaluation team was asked to incorporate any applicable areas in the formative evaluation. Some of the references contained therein are nothing more than considerations for CRTI; others acknowledge the accomplishments and contribution of CRTI, and three other references present specific questions with respect to the CRTI or areas to which CRTI has a link.

The OAG report references have been incorporated in the relevant evaluation results section. In addition, Annex B outlines the applicability of each OAG reference and where they have been referred to in the evaluation report.

Capability-Based Response Approach—Way Forward

The CRTI Steering Committee/Secretariat is proposing to adopt CBP to resolve strategic issues associated with developing a national solution to CBRN terrorism response through further engagement of the S&T community. This includes a need for increased collaboration within a national response strategy.

FORMATIVE EVALUATION APPROACH AND METHODOLOGY

CRTI Formative Evaluation Scope

In general, the formative evaluation scope included CRTI results with respect to the delivery of the four principal mandated activities, the management of the partnering arrangement, and external communications and community liaison.

In accordance with the updated CRTI Program Evaluation Plan (V1.0 of January 20, 2006) this formative evaluation included the review of the following CRTI elements and areas:

- CRTI vision, mandate, investment priorities and stakeholder needs;
- Identification and assessment of the CRTI key requirements required for DND/DRDC to provide the stated vision and mandate;
- Identification and assessment of the CRTI completed activities and ongoing initiatives in terms of their intended objectives, results achieved and contribution to overall program objectives;
- Identification of areas of opportunity to increase overall efficiency and effectiveness with respect to CRTI mandate and activities;
- Identification and assessment of linkages and relationships to key stakeholder departments and agencies, interdependencies and other factors that can influence the attainment of the CRTI mandate, objectives and stakeholder needs; and
- Identification and definition of areas of opportunity for consideration and the recommended priorities/next steps.

The CRTI formative evaluation scope **did not include**:

- Detailed financial audit/assessment of CRTI activities;
- Detailed documentation and analysis of linkages to stakeholders other than the CRTI participating departments and agencies;
- Development of detailed business cases for recommendations included in this report; and
- Implementation support for any transition activities associated with the recommendations.

The formative evaluation key findings and recommendations focused on the six evaluation questions previously listed in the Evaluation Level of Focus section.

Evaluation Methodology

The evaluation team applied the ***Fujitsu Consulting Benefits Realization methodology and Results Chain™ technique*** [1] to gather and assess the information gathered about the current CRTI environment and to visually present what initiatives, intermediate outcomes, risks/conditions for success and linkages are necessary for CRTI to achieve its mandate and other key program objectives.

Benefits Realization is a systematic approach that helps to ensure the successful realization of the intended business outcomes or benefits from programs such as CRTI. The approach is designed to deal with identifying and evaluating benefits as well as the dynamics of tracking the achievement of benefits.

A particular strength of the approach is that it works across all types of organizations and responsibility structures because it is organizationally independent. It helps to identify what needs to be done to achieve the benefits in an effective and efficient manner. To this end, the method contributed to the evaluation and, ultimately, to the development of findings and recommendations to optimize the value of CRTI.

The Benefits Realization approach applied to the formative evaluation was based on the following key concepts that were applied to the CRTI environment:

- Methodology is premised on a shift in focus from managing inputs (or costs) to one of managing business outcomes and benefits, but not to the exclusion of managing inputs and costs.
- Benefits do not just happen simply because resources are applied, roles and responsibilities are assigned, or a project is on time and on budget. It is necessary to proactively manage the achievement of the anticipated outcomes and benefits.

[1]

- Project Management is important for managing initiatives in terms of budget and schedule; however, business benefits are achieved through the design and management of overall programs, like CRTI. Sound project management practices are critical, but strict project management is not sufficient to ensure that expected business outcomes are realized.
- It is critical to not lose sight of why projects and other mandated activities are conducted in the first place. It is this overall integrated program view that provides the requisite level of evaluation, assessment and provision of recommendations necessary for CRTI to achieve its strategic objectives.
- Program Sponsor accountability is a necessary condition for benefits realization in that it demands continuous involvement and ownership of measurable business results for key program-level outcomes and benefits.
- A second necessary condition is the development and adjustment of an outcomes measurement framework that provides performance criteria, targets and monitoring.

The Benefits Realization methodology and Results Chain™ technique [2] that were applied to this evaluation fully support the Treasury Board Secretariat (TBS) Results-Based Management and Modern Comptrollership concepts and guidelines. These methodologies and concepts regarding an outcomes focus have assisted with the design of a number of large capital projects and related programs to achieve the anticipated key business results and/or to support the associated business case for the respective TBS Submission. The identical structured approach for information gathering, analysis and presentation has been and continues to be successfully utilized on numerous engagements with a variety of public and private sector organizations including the R&D environment for a DRDC Sense Thrust benefits review in the fall of 2004. Again, the methodology and concepts have been applied within the context and constraints of the R&D environment.

Evaluation Activities

The CRTI formative evaluation included the following key activities:

- Identification and review of key documentation for project background and for the development of questions and discussion topics for the interview sessions (Reference Annex D for the list of read-in documents);
- Selection of interview participants from an all-inclusive list of SC Members, Project Champions, Project Managers and Partner Contacts that was provided by the CRTI Secretariat Point of Contact;
- Conduct of the individual and group interview sessions to validate understanding of the CRTI vision/mandate and strategic outcomes and to assist in the identification of critical business issues and impediments to the achievement of CRTI outcomes;
- Preparation of the “first cut” CRTI Results Chain model based on documents reviewed and interviews. This “first cut” model was used as the basis of discussion and refinement throughout the Results Chain development workshops;

[2]

- Conduct of a two-day workshop with CRTI Secretariat and other stakeholder representatives in order to further develop and refine the "preliminary" model utilizing the Fujitsu Results Chain Technique.[3] The focus of the workshop was the identification of CRTI activities/initiatives, intermediate and final business outcomes, and risks or assumptions necessary and sufficient to provide the identified key capability requirements and the CRTI strategic objectives;
- Analysis of information collected and development of CRTI formative evaluation findings and recommendations;
- Conduct of the CRTI SC workshop to present the preliminary results and to solicit comments and/or approval (Reference Annex F for the list of SC workshop participants);
- Distribution of the draft Final Report to CRS and the CRTI SC for review and comment; and
- Delivery of the CRTI Final Report and PowerPoint summary deck to CRS for final review and approval.

Selection of Interviewees and Results Chain Development Workshop Participants

The identification and participation of CRTI stakeholders in the scheduled interview and workshop sessions was considered to be a critical success factor for the evaluation.

The evaluation team selected the interviewee participants from a list of available SC members, Project Champions, Project Managers and Partner Contacts. The following bullets provide an overview of the interviewee selection process:

- Given the scope of the questions to be answered by the evaluation and the time constraints, 33 individual and group interview sessions were conducted with the CRTI Program Director, all five Lab Cluster Leads and as many Project Champions and Project Managers as possible. In the end, 58 stakeholders (from the available list of approximately 300) were interviewed (see Annex E for the list of interview participants); and
- Project Champions and Project Managers were selected in accordance with four criteria, namely: the number of CRTI Projects they were involved with; experience in both Project Champion and Project Manager roles; type and/or category of activity involved in; and assurance of a distribution of participation by department, agency and academia.

Operational community representatives (1st Responders) were not on the available list and, therefore, not interviewed. One reason for this is that CRTI is in its very early stages and, it was suggested, too early for end users to provide value. Secondly, as 1st Responders were not considered as direct "clients" of CRTI, their participation on projects and exercises was at a level lower than the intended evaluation focus.

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The ***CRTI Secretariat Point of Contact selected the Results Chain Development workshop participants*** based on guidance provided by the evaluation team. The scheduled participants provided a good mix of role experience, expertise and department and agency representation. Due to circumstances beyond the control of the evaluators, there were fewer participants than expected. This created a challenge to the achievement of workshop objectives (see Annex F for the list of workshop participants).

CRTI—Results Chain Development

The purpose of the CRTI Results Chain model is to illustrate the linkages between various CRTI program components, decisions/initiatives, the desired results and any required conditions that must be present for success. In addition, the model provides a snapshot of the role or contribution of initiatives and interim outcomes to the achievement of desired outcomes/results.

The development of a preliminary draft Results Chain model was based on the review of Annex D documents and interview input.

The limited time available for development of the Results Chain model and the limited CRTI stakeholder participation resulted in the development of the workshop deliverable, the "baseline" or "good initial draft" (defined as one level of confidence below final draft) of the CRTI Results Chain model (v013 of March 16, 2006) which contributed to the formative evaluation analysis and development of findings and recommendations.

The responses to the Evaluation Questions reference the applicable CRTI Results Chain model component(s). ***Results Chain model components are referred to as O-label # for outcomes, I-label # for initiatives and A-label # for assumptions***.

Annex C provides an orientation to and a copy of the CRTI Results Chain model.

EVALUATION RESULTS

INTRODUCTION

This section initially provides a response to the six formative evaluation questions. These results are presented as a general response to each question, additional findings and supporting comments, and proposed areas of improvement and/or areas of opportunity for consideration. **There is overlap/duplication among the questions themselves and the section has been drafted to minimize overlap in the responses. Accordingly, each response is not intended to be a full stand-alone response. CRTI Program activities are addressed as follows:**

- The primary evaluation response for the CRTI mandate and governance-related questions and findings can be found at the responses for Question #1; however, some level of reference to these areas can be found in other responses;
- Lab Cluster related questions and findings—primarily is the response to Question #6; however, other questions and responses include this area as well; and
- The conduct of project activities and operational framework is another key program activity. These activities are primarily covered in Question #5; however, they are referred to in a number of the evaluation question responses.

The factors that were evaluated are those derived from the benefits realization methodology and are summarized as follows:

- Existence of basic generic capabilities or building blocks to provide its mandated activities;
- Clarity of CRTI objectives and individual activity objectives and achievement of intended results;
- Alignment with the overall CRTI mandate;
- Risks that impact the achievement of benefits, such as CRTI organizational structure and processes and procedures; structure efficiency and effectiveness; capability (in the most generic sense) and skills to conduct the required activities, roles and responsibilities;
- Identified conditions necessary for a particular outcome to be realized; and
- Outcomes targets and measures.

A more detailed listing of information gathered, findings and analysis and proposed areas of improvement or opportunity is presented at Annex A in the five generic categories; namely, CRTI Mandate and Governance Framework, CRTI Operational Model, Laboratory Clusters, CRTI Knowledge Management and Communications, and CRTI Ongoing Risks and Challenges (note that Annex A also reflects the number of interviewees (in brackets) to which a respective comment is attributable).

The proposed areas for improvement or areas of opportunity for consideration found at the end of each question response were used to develop the key recommendations that are presented at the end of this section.

CRTI RESULTS CHAIN MODEL AND EVALUATION RESULTS

The Benefits Realization methodology and Results Chain technique [4] provided a structured approach for gathering, organizing, analyzing and displaying information relevant to the CRTI, on a Results Chain model. This visual tool simplified the presentation of the complex and inter-related activities/initiatives, outcomes, risks (or conditions for success) and linkages associated with CRTI.

The CRTI Results Chain model provides a visual roadmap with respect to how the CRTI Program achieves its anticipated outcomes and benefits. The model itself does not indicate the relative value of the contributions that have been identified. In addition it does not depict organizational ownership or accountability of initiatives and results—these can be identified during a more detailed model development and refinement. An analysis of information gathered in conjunction with the model provides the potential areas of improvement or areas of opportunity for CRTI to increase its overall objective to program objectives and to national security strategic objectives.

The workshop to develop the CRTI Results Chain, which included CRTI program participants and stakeholders, identified the key activities that will deliver interim (immediate and intermediate) outcomes. In addition, the CRTI Results Chain model attached at Annex C documents and substantiates the following:

- Confirmation of the three final outcomes for the CRTI Program, namely components O-9, O-10 and O-11 on the Results Chain.
- For the most part the interim key outcomes have been colour-coded (see Annex C) and have been taken directly from the RMAF; however, further refinement will confirm these or provide additional key outcomes that will eventually be used as the key outcomes for outcomes measurement and management.
- Results Chain incorporates completed and ongoing initiatives (blue filled initiatives) and initiatives that are proposed (initiatives with white fill and broken blue outlines). The proposed initiatives have been added as mitigation to other assumptions or risks.
- Substantiation that the CRTI components, Establishment of Lab Clusters (I-10), Increased Funding for Technology Acceleration and R&D Project (O-25), Acceleration of Technology to 1st Responders (O-15) and Implementation of Acquisition Projects (I-13) have contributed to interim outcomes and to CRTI Program Final Outcomes. The degree of the contribution can be stated qualitatively in accordance with the number of assumptions along the various model paths. Assumptions along a path are risks or conditions to the maximization or achievement of intermediate or final outcomes. Therefore, in substantiation of the previous overall assessment and results in brief, it can be said that the CRTI Program components and activities are contributing to the mandate; however, the assumptions represent areas that need to be addressed to increase the overall value of contributions and to maximize the performance of the key and final outcomes (i.e., outcomes with blue outlines).

[4]

- One additional and unintended benefit of the conduct of projects is depicted at O-58, namely project activities may identify new vulnerabilities that need to be addressed. Further refinement of the model will likely identify additional linkages and contributions for this intermediate outcome.
- Results Chain model depicts the importance of exercises (I-38 and O-87) and their contribution and linkage to national emergency response plans (green filled outcome O-89) and to operational communities and to the increase of 1st Responder and operational community capabilities (O-43).

A brief comparison between the Results Chain model and the RMAF is provided at the response to Evaluation Question #1. A number of differences were observed which raise questions regarding the clarity of the RMAF. To this end, the CRTI Results Chain model can be used to help review and refine the RMAF. Key activities can be identified from the initiatives, and the key outcomes can be selected for measurement.

The responses to the evaluation questions include more specific references to the CRTI Results Chain model, where applicable. There is often not a 1:1 correlation between comments and proposed areas of opportunity due to the draft nature of the Results Chain model. In addition, because the model is not intended to be process-oriented, many comments have been identified through the development of specific components of the model.

RESPONSES TO FORMATIVE EVALUATION QUESTIONS

Evaluation Question 1: What is the effectiveness of the governance structure vis-à-vis support to the objective of CRTI? Are there any potential improvements?

General Response

CRTI is well organized, well managed and it supports the achievement of the program mandate, activities and stated objectives. CRTI has provided a national focal point for building S&T capacity for the response to CBRN terrorist events and, although focussed on terrorist instigated events, it has also contributed to the S&T community's ability to respond to non-terrorist events.

CRTI SC and Secretariat provide effective direction and oversight of mandated activities including the selection and approval of projects in accordance with identified S&T gaps. To this end, the OAG April 2005 Report stated that the CRTI CRA methodology is adequate.

The CRTI structure provides an active and flexible management framework regarding the conduct of technology acquisition, technology acceleration, technology demonstration and R&D projects. The management of projects includes processes and oversight regarding calls for proposals through to project selection to help ensure that projects clearly meet established priorities to fill existing S&T gaps. As a result of the proactive management and oversight of the CRTI project operational framework process, only one project has had to be stopped early. One area for improvement is to implement an outcomes management framework to enable CRTI to close the loop once projects are completed and to identify the extent to which the project has filled the respective S&T gap.

CRTI provides dedicated funding for the support of Lab Cluster exercises that test cluster plans, procedures and equipment. Continued support and participation on exercises are considered to be critical success factors for the improvement of collective CBRN planning and response capabilities. Regarding the provision of knowledge management and communications, the CRTI summer symposiums and 1st Responder Day commenced in 2003 and have been annual events to share scientific and technological knowledge and build relationships and enhance communications between stakeholder groups. These and other CRTI-sponsored symposia are well organized and well received by participants.

The CRTI program was implemented and framework documents were developed in a relatively short period of time to enable the timely conduct of project and other program activities. CRTI provided two "calls for proposals" and approved the first set of successful projects in the first six months of operation. Since then, the focus has understandably been on the conduct and oversight of mandated activities, the subsequent calls for proposals, Lab Cluster activities and stakeholder engagement. As events have unfolded, the CRTI Program has evolved and adapted; however, framework documents have not been reviewed and/or rationalized.

There is qualitative evidence that CRTI has contributed to its objective and final outcomes outlined in the CRTI RMAF document as follows:

- Final outcome #1 (component O-9 on the Results Chain refers)—Canadian S&T capacity/capability to prepare for, prevent and respond to CBRN attacks. Lab Clusters have been very effective with respect to establishing their respective networks, and funds have been effectively distributed to the federal S&T laboratories through technology acquisition to replace obsolete equipment, update facilities and enhance scientific teams. Labs and Lab Clusters now have a baseline capacity to prepare for and respond to CBRN terrorist events. This needs to be qualified by the fact that Lab Clusters do not respond as an entity to these events; rather, individual Labs (members) respond in accordance with their home department.
- The successful response to the 2003 SARS crisis is an indicator that S&T networking and knowledge of federal lab capacity and capability has increased in at least one Cluster that already had networks in place for health-related events and that this contributed to the success of this event.
- Exercises have been conducted and it is widely agreed that these are important for training and preparation for going forward.
- Project R&D funding to build capability in critical areas has been provided; however, given the overall duration of these types of projects, many project results are still pending.
- In accordance with CRTI Secretariat and other interviewees, there was an overall expectation that Lab Clusters would gel more quickly and provide outputs and results in a more timely manner. Lab Clusters have had a number of challenges in other key activity areas that have contributed to some moderate achievements that have varied by cluster.
- Final outcome #2 (O-10 refers)—Communication, cooperation, collaboration and interoperability amongst Canadian and international CBRN counter-terrorism communities. Communication, cooperation, collaboration and interoperability within the federal S&T community are strong and growing and this has been demonstrated through the SARS response, Lab Cluster networking efforts and through the increasing interest and participation in exercises.
- Access to international bodies to share knowledge and understand what is being done elsewhere could be strengthened—the existing international cooperation is primarily through department and agency operational roles (as opposed to Lab Cluster activities) and augmented by some CRTI project teams.
- An increased focus on international collaboration commenced in FY 2005/06 and will include Canada/U.S. collaborative projects aimed at enhancing interoperability and integrations (A-31 and I-26 refer).
- Final outcome #3 (O-11 refers)—Effectively positioned Canadian S&T innovation system that contributes to national and international security. The best way to respond regarding this outcome is to look at the draft CRTI Results Chain model for the other components that contribute to this outcome which includes an engaged/innovative Canadian S&T base, acceleration of technology to 1st Responders increased, international recognition of CRTI results, and Federal Labs/Lab Cluster capability to respond to CBRN terrorist events is increased. Some of these contributing outcomes have seen some successes; however, it is difficult to assess the degree of success. To this end, the achievement of this outcome remains a work in progress.

Additional Findings & Supporting Comments

- CRTI currently links to PSAT strategic objectives; however, since 2002 this higher level has evolved to national security strategic objectives.
- Although, there were no interviews with national response officials, input received during the evaluation has indicated that the national response strategy and framework commented on in the OAG April 2005 Report is maturing. The OAG comments regarding the need and importance of integrated plans to effective response reiterates the CRTI approach and ongoing efforts in this area, especially with respect to Lab Cluster roles and department/agency emergency response planning. In addition, the mention of CRTI as a program to enhance the capacity of federal agencies within a broader national response framework acknowledges the importance of the CRTI Program.
- CRTI MOU does not specifically address departments' commitments to support Lab Cluster activities (finding is incorporated within A-47 and A-3). This deficiency contributes to tensions identified in the OAG April 2005 Report regarding Lab Cluster members' roles and their home department roles.
- CRTI SC participation has often been devolved with negative impacts such as: perceived loss of department support and recognition of CRTI further contributing to lack of cooperation and support (A-35 refers), and delegated representatives who do not have the decision-making authority. SC members have indicated that six meetings per year are excessive and attendance at all meetings is not realistic and, in addition, they wish to be engaged at a more strategic level. It was noted that some partners have changed SC member representatives two or three times since CRTI has been operational, and that a sufficient handover is not the norm.
- CRTI documents are neither precise nor consistent with respect to use of terminology and lexicon. In addition, activities and outcomes are framed in the same "active language," making it hard to clearly identify the outcome or objective that is actually expected. Some examples include:
  - Expectations, objectives, intended results/outcomes are not clearly stated. Outcomes and benefits are often described in terms of activities as opposed to the value achieved from doing the activity;
  - Interchangeable use of the terms "national response" and "federal response" and different interpretations of national vs. federal S&T communities;
  - Interchangeable use of the terms "capability" and "capacity;"
  - Interchangeable terms such as "CRTI operational gaps" vs. "S&T operational gaps" vs. "S&T gaps" vs. "priority areas and technologies & capabilities of interest" contribute to a lack of clarity and difficulty to identify and implement outcomes management; and

- Use of the term "output" (e.g., a deliverable such as a project report) vs. "outcome" or "business benefit" (e.g., CBRN operational gaps decreased).

- Key aspects of the CRTI model are being restricted by limitations on authority and competing demands from primary roles. Some examples include:
  - The Lab Cluster concept was initially based on broad guidelines, free-flowing networking and limited authority and control and this concept has been effective with respect to establishing networking and contributing to an understanding of individual laboratory capability (A-9 refers). The concept does not appear as effective for some of the more complex or demanding of the agreed roles, responsibilities and activities. In hindsight, it appears as though Lab Cluster objectives and outcomes were not clearly articulated and that work effort estimates are less than that actually required (A-47 refers). Alternatively, more formal Cluster governance approaches may be required for some of these other roles and responsibilities. Additional information is found at the response to Evaluation Question #6.
  - The Canadian S&T community is over extended. A critical limiting factor for departments is the availability of S&T resources with applicable skills and knowledge which is further exacerbated by conflicting demands on Project Champion time. In addition, the onus is on a few departments to be sponsors and leads for Lab Cluster activities and project activities. In effect, CRTI has become a victim of its own success, in that there is now increased demand from operational communities and other stakeholders.
- As CRTI has evolved, some areas of the CRTI Framework document have been superseded and either the document has not been updated or changes are incorporated into other documents such as the annual Call for Proposals. Having the program outlined in one or two key documents would provide ease of reference especially for new stakeholder representatives.
- Aim of the CRTI RMAF is to define the expected results from CRTI and the logic model of how those results will be realized. Currently, the logic model has the outputs of all activities contributing to all outcomes, which makes the establishment of linkages and analysis difficult. The outcomes (performance) management strategy, thus far, has focused on measuring and reporting on the key activities (numbers of projects, projects conducted with respect to priority areas, funds distributed) and their associated outputs (Project Reports).
- CRTI RMAF, in its current form, does not lend itself to easily track and monitor results and outcomes of CRTI. The bulk of information required to report on outcomes is available; however, it is not readily accessible. In order to answer key questions regarding achievement of mandate and outcomes, additional effort is required. While tracking of activities is still important, it is not sufficient for managing outcomes—performance measures for both activities and outcomes are necessary in order to accurately evaluate program results. For example, tracking the number of projects tells us that the respective capacity gaps are being addressed; however, it does not provide the degree or extent to which the gap(s) are being filled. In comparing the CRTI Results Chain to the RMAF, the following differences are observed:

  - The RMAF key activities and the Results Chain initiatives do not align (e.g., Build S&T Capability is an outcome not an activity);
  - Differences between RMAF key activities arose (e.g., difference between Build S&T Capability (O-13) and Building the Horizontal Capability (O-18));
  - Understanding of which activities contribute to which final outcomes and how this is achieved is much clearer;
  - Dependencies and interrelationships with organizations and programs external to CRTI have been highlighted; and
  - Assumptions and risks associated with initiatives and outcomes have been highlighted.
- CRTI is not mandated to distribute new technology or equipment (OAG Report also refers), which has necessitated reliance, to this point, on the notion of "technology push" where these communities would step up and acquire same. 1st Responders have not exploited CRTI-developed technology or equipment to a great extent and, contrary to original expectations, departments and agencies with an operational mandate have not consistently used the CRTI knowledge to evolve their response plans or to build project technology or equipment deliverables into their long term strategy and plans (I-12, O-43, A-18, A-34 refer).
- Even though the take-up of this new technology has not been as envisioned, there have been notable exceptions like the CBRN Blast Protective Helmet and the Rapid Triage Management Workbench (specific examples contained within O-37).
- Jurisdictional restrictions have required CRTI to focus on S&T capability and capacity gaps at the federal level to the relative exclusion, to date, of P/T/M stakeholders. The CRTI proposed CBP approach is attempting to make these communities more inclusive.
- The CRTI mandate does not include the long-term sustainment of equipment, facilities, S&T knowledge/expertise and overall capability and capacity; however, the importance of these requirements was a common interview theme.

Proposed Areas for Improvement/Areas of Opportunity Re. Evaluation Question 1

- Going forward, CRTI should continue to align with evolving national security strategic objectives (A-39 refers).
- CRTI should work with PSEPC going forward to define a working relationship and to define how the program can support the maturing Canadian CBRN operational response framework (A-1 and I-41 refer). The Canadian S&T community can support, and influence to a degree, but not drive CBRN operational planning and response.
- ADM-level participation is required at SC meetings where they are engaged at the strategic level. It is proposed that a lower level working group could conduct the required work below the strategic level and report to the SC for decisions.
- It was also suggested that SC member representatives conduct a formal handover to their replacements to ensure department continuity and support for CRTI.

- CRTI MOU should be amended to reflect department/agency commitment to clearly defined and agreed to Lab Cluster activities.
- There is a need to review and rationalize CRTI documentation terminology/lexicon in order to clarify roles, responsibilities, processes and outcomes and to re-set expectations.
- Requirement exists to develop and implement a proactive outcomes tracking & management framework to support the RMAF. This framework is required sooner rather than later as a number R&D projects are nearing completion and there is a requirement to understand the degree of program achievement such as what S&T gaps contributing to operational gaps have been closed (A-11 refers).
- The results chain model can be used to help review and refine the RMAF so that it can be used on a regular basis to monitor progress with respect to CRTI objectives. Key activities can be identified from the initiatives, and the key outcomes can be selected for outcomes measurement and management.
- CRTI needs to review and look for ways to more fully engage departments and agencies (A-40 and proposed initiative I-31 refer). The proposed capability-based response may provide this; however, at the time, the details of this approach are still being developed.
- CRTI needs to continue to review and look for ways to extend CRTI governance to include P/T/M and other stakeholders to facilitate their engagement and involvement in CRTI. This issue is larger than CRTI and is included within the CBP approach that is still under development.
- There is a requirement to follow up and address the need for a mechanism to fund long-term sustainment of equipment, facilities and S&T knowledge and expertise (i.e., human resources). This issue is larger than CRTI and there is a need to continue to work with stakeholders to address these critical requirements (A-30 and A-19 refer).

Evaluation Question 2: Is CRTI effective & efficient in meeting its mandate, meeting the needs of stakeholders and in producing the intended results/impact?

General Response

CRTI is meeting its mandate and the needs of stakeholders in an effective and efficient manner and has produced many of the intended results/impact. CRTI focus to date has been at the federal S&T community primarily because of jurisdictional constraints and CRTI Program scope.

The specific needs of all stakeholder groups have not been clearly articulated. The CRTI Results Chain model has helped in some areas and additional focus is required in other areas as the program evolves.

Creating Clusters of Federal Labs

CRTI was effective in its timely creation of Lab Clusters and in its efforts to establish roles and responsibilities that were expected to build S&T capacity to address the highest-risk terrorist attack scenarios. Lab Cluster objectives are described in terms of roles and activities as opposed to achievements which has created some challenges for cluster governance and decreased the overall effectiveness and efficiency for CRTI.

Lab Clusters have provided a number of their intended results/impacts—most notably, very effective establishment of networks; effective and efficient conduct of initial technology acquisition projects; increased understanding of individual lab expertise/capabilities; and effective working relationships within the federal S&T community (O-36 and A-25 refer).

As previously indicated, there was an expectation that Lab Clusters would gel more quickly and deliver the anticipated outcomes/outputs in a timely manner. It is assessed that these delays can at least be partially attributed to the concept of free-flowing networks which are not conducive to completion of the more complex roles and to the realization that initial work effort requirements for Lab Cluster roles and responsibilities were underestimated. There was a general recognition that additional and significant effort is required to maintain and build on these baseline networks and relationships.

Provide R&D Project Funding

CRTI has effectively distributed project funding through focused effort and strict use and management of a balanced portfolio (O-16 and O-25 refer). Up to the end of FY 2004/05, $21.2M has been allocated for technology acquisition projects and $62.2M has been allocated to the remaining project categories. In accordance with the CRTI 2004/05 report, this allocated funding represents approximately one-half of the CRTI funding model and the project funding forecast for the balance of the CRTI first term is approximately $36.0M. The “front-end” loaded provision of project proposals and allocation of funding in the first three years is partially explained by the initial demand and desire to participate. Interview results indicated that the overall work demands on an over extended S&T community, including the demands of the CRTI program, have since tempered some of the original enthusiasm.

The funds allocated to R&D projects are almost equivalent to those allocated for the other types of projects. R&D projects delivered to date have provided valuable insights and knowledge; however, in order to achieve a stronger technology pull, there may be a need to direct funding towards shorter-term projects (proposed initiative I-53 refers). Project proposal and selection is based on criteria to address specific S&T gaps or priority areas (A-46 and I-28 refer). It is acknowledged that due to the required duration of R& D projects and the relatively short period that CRTI has existed, project results are just starting to be available.

The lack of an audit trail for "project in-kind contributions" was raised in a CRTI financial audit as many departments and agencies do not have standard charge-out rates for personnel resources, equipment and facilities and there is inconsistent time tracking by project team members (A-29 refers). The issue is a concern for some Project Managers who have difficulty in estimating the contributions that are required for project proposals and verifying same during project conduct. In-kind contributions should be a concern for departments and agencies that may be providing less or more contributions than actually claimed. It should also be a concern for CRTI in that funding is provided in accordance with a two-thirds vs. one-third contribution in-kind formula.

CRTI has been a well-received source of funding for federal science-based departments and agencies, academia and Canadian industry. To this end, CRTI has effectively involved stakeholders at the federal level to build horizontal networks and to share information (O-18 refers).

Accelerating Technology into Hands of 1st Responders

To the end of 2004/05, 22 technology acceleration projects were awarded with approximately four resulting in a commercialized product. Exploitation of technology acceleration projects is not within the mandate of CRTI; therefore, it appears that this mandated activity is conditional on other factors and issues that are not within CRTI direct control or influence. The take up of new technology and equipment was not as fast or as easy as envisaged.

Canadian industry participation has been as expected; however, in the end their participation is dependent on the potential marketability (national/international) (A-22 refers).

As highlighted in the OAG April 2005 Report, there is a critical and outstanding requirement for standards and certification of CBRN-related equipment in order to ensure that operational authorities (OA) are purchasing certified equipment and technology (proposed initiative I-17, O-85 and O-82 refer). This issue is larger than CRTI; however, CRTI can help to coordinate a feasible approach that is acceptable to stakeholders.

Providing Funds to Build National S&T Capacity

To the end of 2004/05, there have been 71 technology acquisition projects awarded totaling $21.2M, which have contributed to a very well-recognized baseline capacity for response (I-13, O-28 and O-84 refer). There is widespread concern that the current CRTI mandate does not include "sustainment" of this baseline capacity going forward (A-4 refers).

An increased capacity was demonstrated during the response to SARS events of 2003 (O-46 refers); however, a full examination of this response in terms of the number of labs and clusters involved and the use of new acquired technology was not conducted in conjunction with the formative evaluation. Other outcomes measures are required to fully demonstrate increases in capability/capacity.

Additional Findings & Supporting Comments

The following additional findings and supporting comments with respect to meeting the ***CRTI mandate and producing the intended results*** are provided:

- A Lab Cluster equivalent to project in-kind contributions may not be suitable, given that most Lab Cluster activities are not funded; however, as a minimum there is a need to track work effort and use of equipment and facilities for Lab Cluster activities. This need is compounded by the fact that these activities are not yet included in the CRTI MOU. In any event, the result of not tracking work effort to this key activity is that the total cost of the CRTI program does not reflect the associated work effort and use of equipment and facilities, and the department/agency costs do not formally capture the Lab Cluster commitment and the associated opportunity cost.

The following additional findings and supporting comments with respect to meeting the ***needs of stakeholders*** are provided:

- Operational communities have demonstrated increased interest and a desire for engagement in CRTI projects and exercises; however, there is a requirement to manage their expectations vis-à-vis what CRTI and the S&T community can provide (A-40 and I-31 refer).
- There has been minimal information provided to Canadian citizens re. CBRN terrorism response capability/capacity and CRTI (issue included within I-31).
- CRTI has been relatively effective and efficient with respect to providing/facilitating the exchange of CBRN-related information/expertise, collaboration and interoperability with international partners (A-31, I-26 and I-7 refer).

Proposed Areas of Improvement/Areas of Opportunity Re. Evaluation Question 2

- There is a requirement to review and reset expectations for Lab Clusters' outcomes and to review/rationalize the roles/responsibilities vis-à-vis work effort/resources/timelines. Additional supporting information is provided in the response to Evaluation Questions #1 and #6 (A-47, A-13, A-5, A-9 and I-10 refer).
- CRTI needs to explore the option of directed project funding to contribute to increased technology acceleration projects and a corresponding increase in the exploitation of new equipment and technology (proposed initiative I-53 refers).
- CRTI needs to explore the root cause regarding the fewer number of project proposals being submitted and to develop an approach to address the identified cause(s).
- Sustainment of the federal lab baseline capacity re. equipment/facilities/scientific teams needs to be addressed by all CRTI stakeholders. CRTI is encouraged to help to facilitate discussions and to leverage CRTI SC influence and authority.
- CRTI needs to look for ways to develop and implement an engagement model for operational communities at several levels within the program, i.e., at the CRTI level with respect to operational or capability gaps, at the Lab Cluster level re. capabilities and capacities, and at the project level for operational input.
- There is a continuing need to look for opportunities to expand horizontal networks and information sharing to include P/T/M operational communities, within existing jurisdictional limitations, in order to contribute to the building of a "national" vs. "federal" response for CBRN terrorist events.
- There is a need for CRTI to be involved in the establishment of standards and certification for new CBRN-related equipment and the identification of responsible organizations (proposed initiatives I-17 and I-39 refer).
- Overall, communication efforts need to focus on and cater to the needs and expectations of individual stakeholder groups (A-42 and proposed initiative I-31 refer).
- In order to address the in-kind contributions concerns, CRTI should facilitate the development of standard charge-out rates for personnel resources, equipment and facilities and a process to ensure that project team time tracking is accurate. This has been carried forward to a best practice at Evaluation Question #5.
- CRTI should develop a tracking mechanism for Lab Cluster activities in order to accurately track and cost the agreed levels of effort and provision of equipment and facilities. This has been carried forward to a best practice at Evaluation Question #5.

Evaluation Question 3: Have the funded activities proceeded as planned & produced the expected deliverables/impact?

General Response

Up to the end of FY 2004/05, CRTI has allocated funding of $83.4M for the conduct of approximately 120 projects of all categories. This funding allocated represents approximately one-half of that projected for the CRTI first five-year term. Funded activities around the project portfolio (technology acquisition, technology acceleration, technology demonstration and R&D) have proceeded as planned to the end of FY 2004/05 and have produced the expected deliverables. The one exception is with respect to technology acceleration where the opportunities and take up of technology have been less successful than anticipated.

CRTI has a dedicated budget for Lab Cluster exercises and approximately seven tabletop and field exercises have been conducted up to the end of FY 2004/05. Exercises have been well received and more are being planned. A joint cluster exercise is planned for FY 2006/07. Exercises are uniformly seen as one of the best ways to test operational response capability. A key challenge is engaging various jurisdictions in the exercises themselves.

Communications and knowledge management is generally well done with particular note to the summer symposium and 1st Responders Day. The knowledge management portal and newsletters received mixed reviews from interviewees and was dependent upon their respective roles within CRTI. However, these elements now need to be extended to be more inclusive of stakeholders beyond the federal S&T community.

The discussion of Lab Cluster funding is limited to technology acquisition projects and exercises.

Additional Findings & Supporting Comments

- Funded projects have proceeded as planned; however, some departments may have over extended their commitment to undertake projects at the beginning, but have since adjusted. This is substantiated by the fact that approximately one-half of CRTI project funding was allocated to the end of FY 2004/05 and that the projections for the balance of the first term will bring the total below the original CRTI funding level of $160M. Projects have been completed on time and on budget with milestones achieved. Only one project has been terminated early.
- In addition, the onus is on a relatively few departments to participate in projects and/or sponsor projects and this, coupled with the overall shortage of S&T resources, has likely contributed to department and agency decisions to limit CRTI involvement as per the previous bullet.
- Overall exploitation of technology/knowledge (including the take up of new technology and equipment) has not been as fast or as easy as expected. Program involvement has not provided the expected incentive or initial impetus to departments/agencies to evolve their response plans and to build project deliverables into their respective long-term strategy & plans (model A-4 refers). This has significantly limited the take up of new technologies.

- Although not within the CRTI mandate, sustainment of equipment, facilities, S&T knowledge/expertise and capabilities/capacity was a common requirement mentioned in interview sessions.
- Given the relatively long-term duration of R&D and technology acceleration projects, deliverables and impact were not really expected until well into the first CRTI five-year period. The outcomes management strategy, thus far, has focused on measuring and reporting on the key activities (numbers of projects, projects conducted with respect to priority areas, funds distributed) and their associated outputs (Project Reports).
- Exercises are uniformly seen as one of the best ways to test operational capability and identify response vulnerabilities (model I-38 and O-87 refer).

Proposed Areas of Improvement/Areas of Opportunity Re. Evaluation Question 3

- CRTI needs to continue to look for opportunities to even out demands for participation in projects across multiple departments/agencies.
- CRTI needs to identify ways to encourage overall exploitation of technology and knowledge in order to contribute to a technology pull strategy and approach (proposed initiative I-53 refers).
- CRTI needs to continue to work with stakeholders to find a solution for sustainment of equipment, facilities and S&T knowledge and expertise.
- CRTI is encouraged to continue to allocate a portion of budgets to exercises and to focus on lesson learned and follow-up activities in order to maximize the value of conducting the exercises. Further, depending upon the focus in CBP, there may be a need to increase funding for exercises (included within I-38).

Evaluation Question 4: Have the developments in each CRTI activity contributed to desired objectives? Do funded activities support the CRTI mandate and objectives?

General Response

The response to Evaluation Question 4 is similar to some elements of the responses at Evaluation Questions #1, #3 and #6. Again, salient points will be highlighted; however, all detail will not be completely restated.

The developments in each CRTI activity have contributed to desired objectives with some refinements recommended for particular areas. Highlights of activity contributions to their respective anticipated objectives include:

- Lab Clusters have been established and now there is a good understanding of current response capacities and capabilities within the federal lab network. Lab Cluster activities have contributed to increased effectiveness of working relationships within federal S&T community (O-36, O-13 and O-18 refer). The challenge going forward is to maintain this network and capture S&T knowledge. Lab Clusters have evolved in other areas at a varied pace for a variety of reasons—generally, progress has not been as wide and as timely as originally envisaged.
- Technology acceleration, technology demonstration and R&D projects have been selected and funded in accordance with identified S&T gaps and areas of priority (I-28, O-24, O-33, O-25 and A-8 refer).
- R&D projects to increase CBRN capabilities and knowledge have been awarded and some of the first ones are nearing completion. Projects completed have been successful in regards to timeliness and achievement of milestones within respective budget.
- Some technology acceleration projects have resulted in commercialization; however, in general, the acceleration of technology to 1st Responders and operational communities has not been as easy and as timely as originally expected.
- Funding for national S&T capacity has been provided through the technology acquisition projects, which have been very effective in contributing to the establishment of a baseline capability for federal S&T capacity (O-16 and I-13 refer).
- Building of horizontal capability within the federal S&T community has been exceptional and a highlight of the program (model O-18 refers). In addition, the other project categories have engaged other national S&T stakeholders including academia and Canadian industry (I-30 refers). Communications and knowledge management is generally well done with the summer symposium and 1st Responders Day being the ones that received the most recognition. More effort is required to engage additional Canadian national and international stakeholders to maximize desired objectives (proposed initiative I-31 refers).

In regards to whether or not funded activities support the CRTI mandate and objectives, the responses to Evaluation Questions 2 and 3 are very similar. The following highlights are provided:

- ***Contribution of funded activity, CRTI Program oversight*—**program oversight on the CRTI Results Chain model is depicted by O-30. A review of the paths extending from O-30 demonstrate oversight of communications and knowledge management activities, Lab Cluster activities, project funding and project activities and support/contribution to interim outcomes and final outcomes (O-9, O-10, O-11 refer). The one path with the highest risk is the Lab Cluster path and these risks and associated mitigating strategies are discussed in the evaluation questions on Clusters. The tracking of activities is well documented.
- ***Contribution of funded activity, conduct of projects***—conduct of projects is depicted on the model starting at I-13 and O-25. Model also demonstrates the support/contribution of funded project activities to interim outcomes and all three final outcomes. Again, the tracking of activities is well documented. The lessons learned and areas of opportunity for Evaluation Question #5 present some areas for consideration going forward.
- ***Contribution of funded activity, conduct of exercises***—conduct of exercises is depicted on the model starting at I-38 and demonstrates the significant contribution of exercises. Exercises are also shown to contribute to interim outcomes and all three final outcomes. The two risks not depicted on the model are the ongoing challenges to get operational department commitment to participate and the need to involve other jurisdictions.
- ***Contribution of funded activity, communications and knowledge management***—activities are depicted on the model starting at O-40 and the model demonstrated support/contribution to interim outcomes and all three final outcomes. The tracking of activities is well documented. Challenges going forward are to reach out beyond the federal S&T community and at the same time meet the needs of other stakeholders while managing their expectations in regards to what CRTI can and cannot support. Communications and knowledge management support to Lab Cluster roles and activities has been limited to this point.

Additional Findings & Supporting Comments Re. Activities Contributing to Desired Objectives

- The Canadian S&T community and Lab Cluster Leads developed the initial list of Lab Cluster roles and responsibilities; however, expectations and understanding of the roles have evolved. See Evaluation Questions #1 and #3 regarding the following additional Lab Cluster results: review roles and responsibilities and re-assess work effort; achievement of expected outputs and outcomes; exercise successes and plans; over-extended S&T community including Lab Cluster members; CRTI MOU does not include cluster activities and requirements.
- Technology acquisition has been very successful in establishing a baseline federal S&T capability/capacity. A critical issue going forward is how to sustain and continually improve equipment, facilities, and knowledge and expertise.

Additional Findings & Supporting Comments Re. Funded Activities Supporting Mandate and Objectives

- In accordance with the findings from Evaluation Question #1, the key findings for program mandate and oversight involve links to national security strategic objectives; requirement to link to a maturing Canadian response strategy; Lab Cluster activities not included in the MOU; CRTI documents are not precise and lexicon/terminology is not consistent/standard; and limited ability for outcomes tracking and management.
- Projects are funded in an effective manner and project activities are actively managed. Some refinements regarding project proposals, selection and conduct for consideration going forward are identified in the response to Evaluation Question #5;
- Exercises are recognized as one of the best ways to demonstrate capability/capacity and to identify new vulnerabilities/gaps (O-87 and contribution to O-29 refer).
- As indicated in Evaluation Question #3, communications and knowledge management is generally well done with the most praise for the summer symposium and 1st Responders Day. The knowledge management portal and newsletters received mixed reviews. There was general recognition that these elements of CRTI need to be expanded to be more inclusive of stakeholders beyond the federal S&T community (I-27, I-29, I-34 refer).

Proposed Areas of Improvement/Areas of Opportunity Re. Evaluation Question 4

- Lab Clusters successes to date need to be sustained going forward, including ongoing maintenance of the respective lab networks and proactive capture of any S&T knowledge gains. It is proposed that this requirement be included in the list of Lab Cluster roles and responsibilities going forward.
- As detailed in the response to Evaluation Questions #1 and #6, there is a short-term need to conduct an overall review/assessment of Lab Cluster expectations, roles/responsibilities, objectives in consideration of work effort, time and overall resource requirements.
- CRTI needs to continue to work with stakeholders to address the ongoing sustainment challenges.
- CRTI needs to focus communications and education beyond the Canadian federal S&T community (I-30 and proposed initiative I-31 refer).
- Consideration and implementation of suggested refinements with respect to project activities are described in other evaluation questions, particularly Evaluation Question #5.
- CRTI should continue to budget for exercise activities.

Evaluation Question 5: Identify lessons learned from the CRTI delivery model, including the partnering process. What do the parties consider to be best practices?

General Response

The delivery model for projects and the partnering process has worked well. Some adjustments have been made as CRTI has evolved; however, interview input has provided some areas of opportunity for consideration that are presented below.

Interview Input & Supporting Comments

The following interview input and supporting comments are provided for the ***project and partner delivery model***. For most comments documented at Annex A, the numbers of interviewees who mentioned it are included in brackets. It should be noted that just because a small number of interviewees provided a comment, it should not be discounted. The feedback should be reviewed and areas of opportunity considered as CRTI evolves going forward.

- The call for proposal process was generally well received. Priority areas for respective calls for proposals were thought to be clearly defined. Project mix is balanced. Many who had experienced annual workshops to review the overall process thought they should be re-instated.

  The need for ongoing communication regarding changes in priorities was mentioned by a few interviewees. Clarity in language and terminology in CRTI documents will help to promote understanding to those stakeholders outside the core federal S&T community. Some would like to see clearer linkages between gaps and capabilities. A more flexible definition of project categories would help to be more inclusive for those projects that are between R&D and technology acceleration categories.

  Overall, participants liked the call for proposal process. It is suggested that some consideration be given to the constructive comments especially in two areas: first, the clarification of terminology and communications for those stakeholders outside the federal S&T community; and second, a way to recognize projects that fall in between R&D and technology acceleration project categories.

- The proposal synopsis process and phase was well received as a good way to select only those that go to the next stage—without a large work effort. The proposal process is considered fair and well organized. Many like and now prefer the partner approach which is considered to significantly contribute to better planned projects.

  A lesson learned for industry partners that should be reiterated is that the partners should have previously demonstrated that they have the right skills to deliver. Some felt that the importance of partnerships to project success is not recognized by the relatively short timeframes required to meet proposal deadlines. For those departments and agencies that have less experience with project management skills, the workload to develop proposals is very heavy and complicated, but was easier if one has knowledge and understanding of the processes and language. Many had underestimated the time to prepare proposals. In spite of adjustments to the CRTI schedule (for proposals and charter completion), some thought that proposals were in conflict with department year-end activities.

Participants liked the proposal portion of the delivery model, particularly the two-stage proposal approach. The other comments received regarding timing of proposal process and workload involved suggest at least some consideration for adjustment or assistance, especially given the fact that numbers of proposals have started to drop off. In addition, the fact that some target audiences mentioned knowledge of the process and language used caused some anxiety suggests that additional communication efforts for these groups should at least be considered.

- Many thought the project selection process was open and transparent. The process was often characterized as effective and timely in that it keeps applicants apprised of the status of proposals. Many thought that projects are selected on merit and liked the concept of peer review. Feedback provided post review was generally considered to be good, constructive and applicable.

  A few perceived that proposals which closely align to a sponsoring department's mandate appear to be more successful. A few commented that the process does not necessarily select those projects with the highest potential to progress to technology demonstration and beyond.

  The constructive comments regarding the project selection process are related to the perception of bias and that projects with the highest potential to progress towards commercialization are not identified. Again, given the trend to lower numbers of proposals and the need for more timely provision of new technology and equipment, these areas should be reviewed and solutions considered.

- The project management processes received the highest number of comments by far. Many thought that the development of a project charter and required reporting and annual project reviews brings structure, clarity and accountability to projects. Reporting is generally considered to be straightforward and not too onerous. Project Managers considered support from Project Champions and Portfolio Managers to be good, but at the same time recognized the importance of Project Manager experience/expertise. Finally, many appreciated the overall CRTI Program flexibility and, in particular, the roll over of funding.

  A large number of interviewees indicated that time management and commitment is very heavy and cited the time to prepare reports and obtaining partner inputs as two examples. Project Managers from some departments and agencies mentioned encountering technical issues (i.e., incompatible data capture) which hindered financial reconciliation necessary for program reports. When project funding is used to fund person years (PY) and is slow in coming, many had experienced challenges with respect to retaining scientists with the key knowledge and expertise. A few Project Champions/Managers suggested that they would have benefited greatly from a formal handover of duties and project status. A few suggested that the project close out report is not appropriate to capture project knowledge or to close the loop, with either project team members or sponsoring departments, with respect to gaps that were actually addressed.

  The work effort and commitment time for project management and the loss of expertise due to slow funding allotment are important given that there is an overall shortage of Canadian S&T resources and they are over extended. This is substantiated by lower numbers of proposals. Difficulty with respect to financial reconciliation of department data necessary for CRTI reports needs to be addressed—simply putting the onus on Project Managers to sort out is not sufficient. Finally, there should be a best practice instituted that ensures formal handovers are conducted when Project Champions and Managers are replaced.

- Sponsoring of projects from the Lab Clusters is limited thus far with the exception of technology acquisition projects. Clusters may be better able to identify projects that are required to address gaps.
- Application of CBRN equipment/knowledge to non-CBRN terrorist events or applications (multi-use in a positive sense) contributes to the maintenance and sustainment of operational equipment and S&T expertise (O-46 and O-56 refer).
- Some Project Managers are not clear with respect to how and where project results are captured. There is a requirement to close this loop in order to demonstrate value and relevance to departments and agencies.

Key Lessons Learned and Best Practices for Evaluation Question 5

- The terminology used in the CRTI documents available to partners/potential partners, i.e., "Call for Proposals," etc., is not always easily understood, especially the first time through. The lesson learned is that the program documents and communications in general should be geared to all anticipated audiences.
- The team approach to creating a project proposal was often highlighted as a best practice as it results in a better planned project and forces the team to think ahead.
- Another best practice is to retain the Synopsis phase of the proposal process as a very good way to eliminate non-compliant proposals and an effective way to save work effort i.e., only those successful in the Synopsis phase need proceed with the detailed proposal.
- Given the timeframe since the introduction of CRTI, there has been considerable turnover of project sponsors/team members, and there is a requirement for CRTI to continue to communicate/orientate with respect to evaluation criteria/scoring and roles within the review and selection process (reviewers, decision-makers, SC). The best practice is to communicate, communicate and communicate.
- A best practice for CRTI SC members to conduct a formal handover was mentioned at Evaluation Question #1. A formal handover is a recommended best practice when Project Champions and Project Mangers change over.
- A lesson learned with respect to the selection of an industry partner is to ensure that in addition to the requisite knowledge/ expertise, the potential partner has previous experience and a demonstrated history of delivering similar projects.
- A lesson learned is that "roll over" of funds from one year to another, particularly at project initiation, is often necessary because of inherent delays in project start up.
- From Evaluation Question #2, CRTI needs to facilitate the development and implementation of a standard charge-out rate and tracking for in-kind contributions for personnel resources, equipment and facilities.
- From Evaluation Question #2, CRTI needs to facilitate the development of a mechanism to track work effort and use of facilities, etc., regarding Lab Cluster activities.

Proposed Areas of Improvement/Areas of Opportunity Re. Evaluation Question 5

- A number of interviewees suggested CRTI conduct sessions to review/explain the proposal process and the current priorities and changes from the previous year. As an alternative to trying to read/understand the documentation, strong consideration should be given to conducting a Call for Proposals kick-off session and to make it easily assessable even for those outside of the National Capital Region (NCR), e.g., through Webex, teleconference or video conference.
- Knowledge of the process and how to write a CRTI proposal is a key contributor to submitting a strong proposal. One opportunity for knowledge transfer is to "partner" those who have had successful proposals in the past with individuals new to the program.
- A number of interviewees indicated that the proposal timeframes are an issue for project sponsors/team members and it coincides with some GoC department/agency year-end and, therefore, added to the demands at a critical time. It is recognized that the CRTI has already made adjustments to the proposal submissions dates; however, it is suggested that some consideration be given to further review of this timeframe.
- It is recommended that CRTI continue discussions with DND regarding the need for roll over of funds.

Evaluation Question 6: How well have Lab Clusters and associated activities contributed to their objectives & overall CRTI mandate?

General Response

Lab Clusters and associated activities to date have achieved varying levels of success and these successes have contributed to the overall CRTI mandate and objectives. The most significant success has been in the effective/efficient manner that networks were established with an increased awareness of individual lab expertise/capability/capacity and that technology acquisition project success has resulted in a baseline capacity/capability for CBRN terrorist response. In addition, communications and cooperative working relationships within the federal S&T community and between government departments and agencies are significantly more effective as a result of CRTI. All clusters have developed their respective implementation plans and the three initial Clusters have updated or are updating their business plans.

In accordance with report of the CRTI Renewal Workshop Session held in March 2005, some specific examples of successes by Lab Cluster include:

- Chemical Cluster—creation of the cluster (a new concept); assignment of target agents by lab, by media; acquisition of technology projects to address gaps in response capability; business plan and two-year work plan; technical response plan contacts; and conduct of table-top and field sampling exercises.
- Biological Cluster—capability development and effective working relationships (particularly between HC, CFIA and DRDC); technology acquisition projects; increased testing/capacity; collaborations during response and working relationships; increased awareness on capabilities and responsibilities of who does what; products of CRTI projects and Cluster organization activities; collaborative response to critical events; and established links to RCMP and DND.
- Radiological/Nuclear Cluster—enhancements to Accident Reporting and Guidance Operational System (ARGOS); Radiological Dispersal Device characterization; decontamination and restoration (pan-cluster project); standoff detection; airport surveillance capability; and, Laboratory Information Management System.
- Forensics Cluster—developed implementation plan.

This demonstrates that the pursuit of Lab Cluster roles/activities and the level of success have evolved at a varied pace. This is due to a number of factors including, but not limited to, the size and complexity of Lab Cluster networks; maintaining interest in Cluster participation because of the “fatigue factor” of S&T resources; perceived lack of priority by department senior management and competing demands; an evolving Canadian CBRN response strategy/framework; lack of clarity and scope for Lab Cluster activities that have raised tensions between department and Lab Cluster roles; and the fact that it has taken time to work through some of these issues at the Lab Cluster level on a part-time basis.

It is difficult to assess the degree to which Lab Clusters/activities have contributed to their objectives because their objectives and corresponding scope are not clearly articulated in either the Framework or the RMAF. Again, the Lab Cluster Renewal Workshop concluded, among other things, that there is no formal way to measure (program and Lab Cluster) successes. This is substantiated by the list of Lab Cluster roles and responsibilities that was provided and agreed to without clarifying objectives or outcomes. In the absence of clear objectives, expectations have emerged. In accordance with at least one Cluster Leader, clusters were challenged by the lack of clarity regarding roles and objectives. Contrary to some of the more widely held expectations, Lab Clusters have not come together as quickly as envisaged and they have not delivered on many of the stated activities in a timely fashion.

Given the Lab Clusters concept of free-flowing networks of laboratories with limited authority/control and the varying expectations and limiting factors mentioned above, it is assessed that the probability of Lab Clusters being able to meet all expectations and fulfilling all elements of all roles/responsibilities in an effective/efficient manner is low to medium. There needs to be a re-set of expectations, and clarification of objectives and scope/activities in consideration of the timeframe, work effort and resources necessary to achieve some level of success. As a minimum, Lab Clusters require more time to work through their individual issues and more time to implement.

Additional Findings & Supporting Comments

- Lab Clusters have demonstrated significant effectiveness/efficiency in establishing their networks, contributing to increased awareness of individual lab expertise, capabilities and capacity. The concept of free-flowing networking does not appear as effective for some of the more complex or demanding of the agreed roles, responsibilities and activities. In hindsight, it appears as though Lab Cluster objectives and outcomes were not clearly articulated and that work effort estimates are less than that actually required. An alternative more formal Cluster governance approach may be required for some of these other roles and responsibilities.
- Lab Clusters have established a baseline capacity and capability through technology acquisition project success. The challenge going forward is to sustain this level and/or to pursue some level of continual improvement.
- Lab Clusters have developed respective implementation plans and the three initial Clusters have updated or are updating their business plans. However, overall, Lab Clusters' success in fulfilling their roles/responsibilities has varied by Cluster and by role.
- A number of exercises have been conducted, and these are seen as the best way to demonstrate capability and to identify additional vulnerabilities and risks/gaps. There has been minimal focus on pan-cluster activities, to date; however, a pan-cluster exercise is planned for 2006/07.
- Lab Cluster activities are not formally endorsed by departments/agencies as they are not included in the CRTI MOU.

- Department/agency S&T personnel are over-extended and contributing factors include being a victim of their own successes, resulting in an increased demand for coordination, consultation and participation with stakeholders. This demand carries over to the Lab Cluster requirements which are conducted on a part-time basis. Lab Cluster successes to date have resulted from the dedication and focus of an increasingly over-extended group.
- In response to the over-extended comment or finding, it has been suggested that home department roles and Lab Cluster activities are almost one in the same and that both can be accomplished effectively and efficiently. On the contrary, Lab Cluster experiences do not support this view. In accordance with the Lab Cluster Renewal Workshop report, all clusters found it more difficult to maintain the interest and involvement of cluster members in the CRTI program. The report also highlighted the difficulties encountered to maintain cluster member and department interest in and support of an agenda which does not always completely align with the individual department's agendas or pressing interests at the moment.
- Capabilities and capacity required by Lab Clusters to fulfill their roles/responsibilities far exceed availability. In the end, the challenge is that the S&T personnel cannot be in two places and address operational roles/responsibilities concurrently with S&T advice and guidance roles/responsibilities.
- In addition to Lab Cluster objectives and scope not being clearly articulated, the use of terms contained therein is not consistent—such as standard operating procedures vs. standard protocols. In addition, the CRTI Framework implies in some areas that Lab Clusters respond as an entity to a CBRN terrorist event as opposed to individual Labs responding through their home department/agency mandates. This continues to contribute to the tensions identified in the OAG April 2005 Report.
- There is widespread agreement that standards and a certification authority for CBRN-related equipment is a critical requirement. Lab Clusters want to be involved in the development of standards; however, they want to stop short of being the certification authority.
- The OAG April 2005 Report posed the question within the context of technology acquisition projects and their contribution to the increase of federal lab capacity: "How will labs work together and use the new equipment in an emergency?" It is clear that these initial projects have established a baseline capacity and the challenge going forward is how to sustain and substantiate these gains. The Lab Cluster successes in and around the SARS, BSE and other events do not directly respond to the OAG question. The direct response would involve demonstration of capability re. many of the activities and expected results encompassed within the Lab Cluster roles and responsibilities through established outcomes tracking and on exercise scenarios for CBRN terrorist events.

Proposed Areas of Improvement/Areas of Opportunity Re. Evaluation Question 6

- The tensions created by conflicts between departmental/agency roles and Lab Cluster roles still exist. The root cause(s) of these tensions need to be confirmed and addressed at the appropriate level.
- The Lab Cluster approach was and remains an important element of CRTI; however, the approach needs some refinement. To this end, the concept of free-flowing networking and the roles and objectives of Lab Clusters needs to be revisited. Some consideration should be given to opportunities involving alternative approaches for the delivery of some objectives and/or to having roles/objectives that are tailored to specific Lab Clusters.
- An assessment of some of the original expectations versus the workload requirements and challenges that have been experienced also suggest that it is time to re-assess the roles/responsibilities in consideration of the associated timelines, work effort and resources requirements.
- Assuming that Lab Cluster roles/responsibilities, etc., are clarified and scoped, and clear objectives are established, it will be feasible to assess how close Lab Cluster roles are to home department/agency roles. This will help to identify the cost of Lab Cluster activities to departments/agencies, and it will help to clarify expectations leading to a dedicated level of department/agency commitment/support to Lab Cluster activities.
- Going forward, Lab Clusters need to consider the OAG April 2005 question on how will Labs work together within their overall cluster management planning and implementation. In the context of cluster roles/responsibilities and objectives within an evolving Canadian national CBRN response framework, this may be a very important criterion with respect to deciding what labs require further equipment and facility upgrades.
- As highlighted in the 2005 OAG Report, equipment standards and certification authority continues to be a critical requirement. It is imperative that CRTI work with the appropriate stakeholders to address this issue in the very short term.
- CRTI needs to implement a focused communications effort on behalf of Lab Clusters that targets various stakeholders in order to continue and expand efforts to clearly communicate program objectives and scope and set the expectations regarding the role of the S&T community.

EVALUATION RECOMMENDATIONS

INTRODUCTION

In order for CRTI to continue to strengthen Canada's preparedness for, prevention of, and response to a CBRN terrorist attack, through investments in S&T, CRTI must directly address and/or influence four key challenges and one already proposed way forward approach.

The five key recommendations are presented below through a short description of the issue or topic that includes a proposed timeframe for management action, suggested accountability, and a brief assessment of the impact of implementing the respective recommendation.

It is important to note that the first four recommendations are considered necessary to enable CRTI to function with increased effectiveness and efficiency regardless of when the fifth proposed way forward approach is implemented. To this end, the first four recommendations are considered to be separate from the proposed way forward approach unless the timing coincides.

The proposed areas for improvement, areas of opportunity and best practices sections of the respective Evaluation Questions provide additional recommendations for review and consideration and are not repeated in this section.

RECOMMENDATIONS

CRTI Governance

The governance-related findings and comments were mainly presented in the responses for Evaluation Questions #1 and #6; however, other response sections refer as well. The respective recommendations are considered to be critical success factors, mostly in the **short to mid-term**, for CRTI to strengthen its overall governance approach to meet identified issues or challenges, provide increased effectiveness and efficiency and be in a position to demonstrate its overall contribution to national security strategic objectives.

The following specific governance-related recommendations are provided (note that most, if not all, of these governance-related topics and recommendations are interdependent):

- *Clarify CRTI inter-relationships with nation-level response framework & authorities*. CRTI SC and Secretariat need to continue to engage PSEPC to define a working relationship and to define how the program can support the maturing/evolving Canadian CBRN operational response framework. In the short to mid-term (three to six months) the aim should be to identify objectives for CBRN S&T and the specific areas where CRTI can contribute to national security objectives. Once this working relationship is solidified, it will permit CRTI to further define or refine, document and maintain the Canadian CBRN S&T capability requirements and S&T gaps list. This in turn will contribute to the development of clear expectations, objectives and business outcomes necessary for outcomes tracking and management. Once the refined CRTI framework is decided, it will enable CRTI to fine-tune the specific CRTI business rules and process to ensure that they contribute to the achievement of program and project objectives.

- *Lab Clusters*—In the short to mid-term (three to four months) CRTI Secretariat needs to undertake a review and assessment of Lab Cluster roles, responsibilities and expected outcomes in accordance with the required work effort, resources and timelines to achieve the expected outcomes. Again, this initiative is anticipated to be relatively work effort intensive, as it will involve a review, an analysis and likely development of an amended set of roles/responsibilities/outcomes, possibly by respective Lab Cluster. Once the amended set of roles and responsibilities and objectives and/or outcomes is implemented it will set realistic expectations and set Lab Clusters on the road to successful achievement of defined outcomes. This work will also contribute to any MOU amendments.
- *CRTI MOU*—In the mid-term (four to six months) CRTI SC and Secretariat need to develop and implement a strategy to ensure member departments' and agencies' commitment to the CRTI and to Lab Cluster activities. The objective of this strategy is to decide and amend the CRTI MOU to formally recognize the work effort and other demands involved with achievement of Lab Cluster roles/responsibilities and objectives. The MOU amendment will address the root cause of the tensions currently caused by conflicts between Lab Cluster activities and home department and agency roles. In addition, the discussions and commitment will contribute to the clarification of expectations which will further contribute to addressing the inconsistencies among the various departmental response plans.
- *CRTI Documents*—In the short to mid-term (three to four months) CRTI Secretariat needs to review its program documentation (e.g., MOU, Framework, RMAF, and Call for Proposal Guidebook) with the objective of establishing clarity and discipline of terminology and lexicon. This initiative is anticipated to be work effort intensive, as it will involve identification of the areas to be addressed, analysis and identification of the solution and the amendment of the framework documents in question. Once the documents are amended, the result will be overall increased effectiveness and efficiency through clarity of expectations, clarity of objectives and clarity of outcomes which will in turn contribute to an RMAF logic model that can be tracked and measured.
- *Outcomes Tracking & Management Framework*—In the mid-term (four to six months) CRTI Secretariat needs to establish an outcomes tracking and management framework. Once implemented, the obvious impacts will include clarification of the CRTI RMAF and establishment of the ability to measure CRTI's achievements with respect to filling S&T gaps that in turn contribute to closing operational gaps or other key outcomes.

Greater Exploitation of CRTI Project Results

Increasing national capability and capacity to respond to CBRN terrorist events is driven by operational communities' (including departments and agencies with operational roles) access to and use of tools as well as S&T knowledge. To date, the "pick-up" rate of equipment and/or prototypes i.e., *exploitation of CRTI project results* has been lower than expected and the cause appears to be either a smaller market to bear the costs and/or the prototype is not seen as an immediate need.

In the mid- to long term (six months +), CRTI SC and Secretariat, as part of the national security framework, need to work more closely with operational communities, departments/agencies with operational roles, and provincial, territorial and municipal authorities to identify their requirements for equipment and knowledge. This engagement can be initiated in the near term; however, it

is recognized that this will be an ongoing and continual improvement endeavour. The objective/impact of this initiative will be an increased understanding of operational response gaps from the operational community perspective that will contribute to an increased ability for CRTI to target its activities (e.g., identify S&T gaps, selection of projects, and conduct of exercises) to better meet end-user needs i.e., establish an environment for "technology pull." In addition, this will provide initial awareness and perhaps incentive for applicable departments/agencies to build CRTI solutions into their long-term strategy and plans. Another benefit of exploitation would be the continuing engagement of Canadian industry since commercialization of the technology is the reason they are in business. Finally, implementation of this initiative does not preclude the need for the longer term R&D category of projects. Rather, the mix of projects and cluster activities must be re-set to bring a stronger focus on short-term needs than before.

A critical success factor for greater exploitation is the development of standards and certification of CBRN-related equipments. In the short term (two to four months), the CRTI Secretariat needs to continue to engage stakeholders and work towards establishing and implementing these standards and certification functions. Once implemented, the standards function will provide the necessary standards/targets for the development of CBRN response-related equipment and the certification function will ensure that the operational community is purchasing equipment that will perform to standards in the event of a CBRN event.

Sustainment of Expertise, Knowledge and Equipment

Sustainability of CBRN-related scientific expertise, knowledge and equipment and facilities was another common theme during the interview sessions. Sustainment is not currently within the CRTI mandate; however, the SC and Secretariat are in an excellent position to facilitate a mechanism that would establish a sustainment framework and to assist in the implementation of a way forward approach in three critical areas.

In the mid-term (up to six months), CRTI SC members are asked to leverage their roles and networks to assist the Secretariat, Lab Clusters and member departments and agencies to facilitate discussions and assist in the development and implementation of a sustainment framework in three areas as follows:

- Increased retention of project personnel at the completion of CRTI projects;
- Increased retention of S&T knowledge within departments that have sponsored projects through a department resource forecast or plan; and
- Increased ability of departments and operational communities to develop long-term strategies and plans, including the maintenance of facilities and equipment purchased by departments/operational communities (O&M budgets).

The impact of this initiative would be increased sustainment and, perhaps, continuous improvement regarding the CBRN sustainment challenges leading to an S&T contribution that will provide maximum value to the national security strategic objectives.

CRTI Communications Strategy and Plan

In the mid-term (up to six months), this CRTI component should become more visible. To this end, the CRTI Secretariat needs to revise and implement a *CRTI Communications Strategy and Plan* that will target a wider variety of audiences. The objectives of this plan are to set and maintain stakeholder focus and expectations regarding CRTI, to raise awareness in other communities outside the federal community, and to support the engagement strategy to obtain buy-in and participation of those communities. This initiative is expected to be work effort intensive and should include the following elements:

- Identification and situational analysis of the CRTI risks, considerations and sensitivities that exist;
- Develop a communications plan to include the key messages that will address the risks, considerations and sensitivities;
- Develop a communication approach to include target audiences/key stakeholders, communications mediums, communications tactics or key activities and accountability for the development of communications tools (such as presentations); and
- Develop a detailed plan and tactics summary/schedule of communications activities in the following suggested table format:

Audience	Purpose	Medium	Date/Frequency	Responsibility	Key Triggers	Measurement

The communications planning should also include, as a minimum, the development of outcomes-focused presentations targeted at CRTI SC members and Secretariat staff.

The impact of this initiative would be to re-set awareness, understanding and expectations of CRTI for the federal S&T community and a wider audience that would include, but not be limited to, operational communities, provinces, territories and municipalities, international partners and Canadian citizens in general.

Capability-Based Response & Planning

CRTI is proposing a shift from the present capacity-based response planning to CBP to resolve strategic issues. This initiative would be under the authority of the CRTI SC and Secretariat; however, the specific timeframe for implementation is not clear at this time. The following requirements and challenges are presented with respect to the development and implementation of a new approach:

- Significant challenges will be to clearly define what capability-based response and planning is, who would be the stakeholders, who would be involved in day-to-day CRTI activities, the national security objectives and outcomes that are expected, and how CRTI outcomes will contribute to these national security outcomes. This last point involves defining what will CRTI do and what it will not do.
- Based on this knowledge, CRTI can then review and modify, as appropriate, its business model i.e., CRTI framework, procedures and processes. This will include implementation of changes to the risk assessment/operational gaps, changes to project selection and changes to the outcomes management framework, which will enable CRTI to track and explicitly report progress in meeting its outcomes. To do this, CRTI will need to determine specific metrics for outcomes, not just activities, and report on what capabilities have been developed and where capability/capacity needs to be created.

- Increased focus on capability-based response is anticipated to require a stronger involvement from the operational communities at various jurisdictional levels. CRTI will need to develop and implement an engagement model to formally engage both jurisdictions and operational communities in both Cluster and Project activities.
- A corresponding Communications Strategy and Plan will assist in creating overall awareness, understanding and setting of expectations with the targeted audiences.

ANNEX A—EVALUATION DETAILS

CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Overview		

▪ CRTI in general well organized and managed.
  ▪ Active management and accountability framework (x9)[5].
▪ Focus on renewal.
▪ Shifts accountability to appropriate departments where operational planning not done well.
  ▪ It should force them (i.e., depts) to improve.
▪ Strict project control/mgmt.
▪ Secretariat is as flexible as possible (x2).
▪ Overall successful (x3).
▪ Support from Secretariat to project managers has been excellent (x4).
▪ National focal point (x1).
▪ Getting close to understand the "baseline."
▪ Expectation Management (x5).
  ▪ Not a grant; seen as willing to "walk the talk" and stop projects that are not delivering.
  ▪ Departments/agencies to take on support and maintenance of Tech Acquisitions and provide "surge" capacity.
▪ Bottom up approach—no "operational framework" (x1).
  ▪ There is a disconnect between CBRN (top down) and responders (bottom up).
▪ Temporary nature of CRTI (5-year windows) (x1).
  ▪ Always a concern that it may be stopped.
	▪ CRTI is well organized and managed, and has an active management framework in place.
	▪ CRTI has provided a national focal point for CBRN terrorist events, enabling an overview of gaps and vulnerabilities within the ability for Canada to respond. Though focussed on terrorist instigated events, it has also brought into focus Canada's ability to respond to non-terrorist CBRN events.
	▪ CRTI provides good support, though turnover of Secretariat personnel created some churn.
	▪ As yet, a robust national framework for CRTI to plug into does not exist. CRTI has focussed on building S&T capacity and capability from the "bottom up." Its mandate, though, stops short of equipping 1st Responders (or operational communities). There is a disconnect between 1st Responders' needs and what CRTI provides. CRTI has employed a "technology push" strategy in building S&T capability and capacity. There has been little "technology pull" where projects are funded based on identified 1st Responder needs.
	▪ Up to 2004/05, essentially the same amount of funding was provided to R&D projects, as for Tech Acceleration/Demonstration projects. Going forward, to achieve a stronger "technology pull," more money may need to be directed towards shorter-term Tech Acceleration/ Demonstration projects:
		▪ CRTI is a well-managed program that should continue. Its current mandate to build S&T capacity and capability to respond to CBRN terrorist events is still valid, but increased emphasis should be placed on increasing response capability, as well as maintaining the existing level of capacity and capability.
		▪ To achieve this, capability-based planning and response should continue to be incorporated into the CRTI governance and operating framework.
		▪ Aspects of the CRTI governance structure to be revisited and updated include:
		  ▪ Investment priorities;
		  ▪ Funding allocations;
		  ▪ Project categories;
		  ▪ RMAF (September 2003); and
		  ▪ CRTI Framework (May 2002).
		▪ CRTI should investigate mechanisms to direct or target funding of projects aimed to address key capability or capacity gaps.
		  ▪ This mechanism should be sufficiently flexible as to allow CRTI to commission a project through the R&D lifecycle to a prototype or proof of concept. Establish gate or off-ramp processes that can be employed to ensure the project is delivering the anticipated results.

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ANNEX A

CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Overview (cont'd)		
▪ Can't turn S&T knowledge on/off like a tap—5-year windows are not effective and efficient for the establishment of S&T knowledge and expertise. ▪ SC membership/attendance delegated too far down (x1). ▪ Turnover of SC attendees is an issue. ▪ No decision-making authority of delegates. ▪ Need to go back to ADM-level participation. ▪ Need ADMs there for agreements/decisions. ▪ Considered a "DND" baby. ▪ Missed the ball on plant health side of BIO. ▪ Hard to track down CRTI to get questions answered. ▪ Priorities are cluster-oriented. ▪ Is Canada overlooking its capacity to respond to terrorist events? ▪ Leverage international contacts and MOUs to support CRTI activities/projects. ▪ CRTI intent is to move towards "…capability-based response, exploitation of multi-use technology, and continuous review of the Consolidated Risk Assessment as a basis for assigning funding to priority areas" and striking a balance between "…generating new ideas and targeting investment into gap areas…" (CRTI Annual Report 2004/05 p. 33).	▪ Projected distribution of funds (2005/06, 2006/07 and 2007/08) indicate a large portion of funds being spent on R&D projects. ▪ The perception exists that CRTI is pre-disposed to R&D projects. Shifting focus to capability-based response should shift focus to technology acceleration/demonstration type projects. The perception that CRTI is a "high science" exercise needs to be addressed. ▪ Expectations in terms of CRTI project management requirements are well understood. CRTI does not provide grants, and if projects veer off-course or fail to meet control requirements, they will be reviewed and potentially stopped. ▪ Expectations in terms of CRTI scope and mandate are less consistently understood. This may be due to personnel changes over the past 4 years, or as CRTI approaches its renewal, there is additional discussion around what CRTI should and should not do. ▪ Though part of a larger discussion, the degree of visible GoC commitment to S&T research and innovation impacts CRTI. S&T research and innovation has a longer lead time, which needs to be taken into account when deciding which proposals to fund. ▪ Key CRTI documents (the CRTI Framework and the CRTI RMAF) have not been updated since their original issue. Going forward, these documents need to be reviewed and revised.	▪ Additional emphasis should be given to CRTI communications activities. As new participants enter, stakeholder community broadens and its business model changes; communications become increasingly important to develop consistent understanding about CRTI, and to manage expectations. ▪ The Canadian national security objectives are still evolving. CRTI needs to work with its partners to contribute to the definition of these objectives, to clarify how the outcomes from the CRTI contribute to overall national security objectives, and to confirm the activities it will undertake (and avoid potential duplication). ▪ Ensure proper handovers are conducted to new CRTI personnel (e.g., Secretariat members, SC members, Project Champions and Project Managers).

ANNEX A

CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
CRTI Lab Cluster		

▪ CRTI Framework, Annex C, lists Lab Cluster roles and role elements. This list was created by original Cluster Leads and members and submitted to CRTI Secretariat.
▪ Lab Cluster concept is based on a free-flowing network of labs with limited authority and control.
▪ Confusion and debate is occurring regarding Lab Clusters' roles (x3) and the wording of role elements, e.g.:
  ▪ Standards & certification ("provide certification services and/or evaluation/ validation of field and laboratory equipment"); and
  ▪ Balancing 1st Responder and Cluster member roles (for certain CRTI participants).
▪ MOU only references department commitment to project activities. It doesn't reflect commitment to Cluster activities.
▪ Not sufficient support to Cluster Leaders.
▪ Lab Clusters are silos.
▪ Need Risk assessments across CBRN (x1).
▪ Risk assessment excluded OAs and 1st Responders.
	▪ Lack of clarity re. objectives resulted in varying expectations re. Cluster roles that have evolved and changed over time.
	▪ As Clusters have begun revising their business and implementation plans, they have questioned their roles and responsibilities in terms of (a) should they be responsible for a particular role element and (b) do they have the resources to fulfill the responsibility?
	▪ Concept of free-flowing network of labs has worked for development of networks and capturing of lab expertise and capacity; however, it may be less effective for more complex roles.
	▪ Given the number of role responsibilities and the facts that (a) the Cluster Lead is a non-funded, part-time position and (b) that Cluster membership is largely voluntary, it is questionable whether all role responsibilities can be achieved. As well, it is questionable whether each lab network can and should cover all roles.
	▪ The CRTI MOU does not explicitly mention Cluster roles and activities; as such, this aspect of CRTI structure may have been neglected or overlooked in terms of departmental/agency contribution to CRTI.
	▪ Over the past several years, non-terrorist events have occurred which have tested Cluster networks and roles, and provided insights into response plans and activities. These events include BSE and SARS.
	  ▪ It is unclear how many clusters were involved in the BSE and SARS response.
		▪ Review the Lab Cluster framework. Each Lab Cluster should have the same objectives or expected outcomes. However, how they achieve those outcomes may differ.
		▪ Pan-cluster relationships/interfaces have not really been explored to date. Differences in approaches should take into account pan-cluster needs and requirements.
		▪ CRTI should expand the MOU to include Cluster activities. CRTI should investigate and determine an expected level of "in-kind" contributions (e.g., time) that participating departments/agencies can make with respect to Cluster activities.
		▪ Further emphasis on pan-cluster interactions and roles is required. Potential threats do cross C, B, & R/N boundaries, and clusters are in a position to determine how labs can work together to address these events.
		▪ Review Cluster Technical Advisory Plans to include or reflect pan-cluster interactions (triggers, roles/responsibilities, etc.).
		▪ Review and test Cluster Technical Advisory Plans along various scenarios, including instances where a CBRN terrorist attack is identified after the initial "outbreaks" (e.g., what if SARS was a result of a terrorist attack?).

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CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
CRTI Lab Cluster (cont'd)		
	▪ It is unclear how the response would have unfolded had the BSE and SARS turned out to be terrorist-instigated. ▪ Response is considered an indicator of overall Lab Cluster capability; however, events likely involved one cluster that already had health-related networks established.	
Key Outcomes		

▪ Horizontal Networking (x20).
  ▪ Community partnership.
  ▪ Non-traditional partners.
  ▪ Sharing of information.
  ▪ Opened up new world of counter-terrorism information sharing.
  ▪ Less competition.
▪ Breaking down barriers between departments (this is an ongoing effort).
▪ Identification of gaps in response preparedness, prevention and response.
  ▪ Big glaring gaps filled.
  ▪ Other gaps filled or being filled (x2).
▪ Scientists think beyond what they used to (dual use of technology) (x2).
▪ Many projects funded by CRTI that otherwise would not have been done (x2).
  ▪ Funds Federal Government R&D labs—one of few programs to do so (x6).
  ▪ Funding of Tech acceleration, demonstration and acquisition projects (x10).
▪ Funding for CBRN Response/Activities (x2).
	▪ A key CRTI benefit to date has been the degree of information sharing, and collaboration that has occurred as a result of horizontal networking, both from the Cluster and project perspectives.
	  ▪ This has broken down silos between (and perhaps within) departments and agencies, creating stronger Canadian knowledge of CBRN response capacity and capability.
	▪ Bringing together formerly disparate communities has resulted in a deeper understanding of risks facing Canada, and the identification of gaps and vulnerabilities in each response dimension. From this, CRTI was able to fund projects to fill these gaps and address vulnerabilities.
	▪ Without CRTI, these projects would not have previously been funded. It was and is a welcome source of funds.
	▪ The vast majority of these projects have delivered to their stated objectives. Four Tech Acceleration projects have resulted in commercialized products.
	▪ In the beginning of CRTI, there was less emphasis on forensic investigation requirements; however, a new Forensic Cluster was established in 2005 to address this gap.
		▪ Continue to focus on horizontal networking across the S&T community within federal departments and agencies. Maintain relationships and dialogue concerning new/ emerging risks, current capability/capacity levels, gaps, and responses.
		▪ Review portfolio allocations to determine which projects and activities should receive more funding, under the capability-based planning approach.
		  ▪ Additional resources may be required of Secretariat to provide better support to Clusters.
		  ▪ More Technology Acceleration/ Demonstration projects.

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CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Key Outcomes (cont'd)		
▪ Better Canadian response to non-terrorist events. ▪ Focus on CBRN—dual use could be more effective. ▪ More focused/targeted funding (x1). ▪ Missing good ideas because proposals are not written well. ▪ No focus on detection and consequence mgmt. ▪ Redefine what Tech Acceleration to 1st Responders really means. ▪ May need to go 1 step beyond POC or prototype. ▪ Hard to identify markets & revenue sources (x1). ▪ Need to take the product beyond demonstration; otherwise, it will "die."	▪ Some projects may fall through the cracks due to their categorization, particularly for follow-on projects, i.e., the follow-on project may no longer be considered R&D, but is not quite at the Technology Acceleration phase. ▪ To better support capability-based responses, CRTI should have a mechanism to direct funding to fill a specific gap. It currently does not have such a mechanism.	
Outcomes Tracking and Management		

▪ RMAF measures not captured formally.
▪ Try to reflect RMAF progress in Annual Report.
▪ Do not report on "gaps" filled (x1).
  ▪ Other than the big glaring ones.
▪ No hard and fast performance measures.
  ▪ How do you measure "filling the gaps"?
  ▪ Perhaps gaps are covered because several projects were funded.
  ▪ Results not vetted against initiative's gap.
	▪ There's no formal tracking and monitoring process to determine the degree to which gaps have been filled.
	▪ Within the RMAF, activities are tracked and reported—while this is important, it does not generally indicate degree of achievement. It is through the completion of various activities substantiated by specific measures and targets that indicate the degree to which outcomes are being achieved.
	▪ A lot of the information and data required for the establishment of an outcomes tracking and management framework is captured; however, it is not readily available.
		▪ While still necessary, tracking activities are not sufficient to determine the extent to which CRTI outcomes are being realized. Monitoring activities will enable an organization to understand when outcomes should start to be realized, but they do not indicate the level of achievement.
		▪ Update the RMAF using the Results Chain model in order to clearly articulate and differentiate key activities and outcomes.
		▪ Establish an outcomes management framework around the RMAF to track outcomes realized.

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CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Resource Constraints		

▪ Limited number of scientists to do work—they're tapped out and over extended.
  ▪ Focus/rely on relatively few depts. to be sponsors and leads (x3).
  ▪ Some labs have over-committed lab space.
  ▪ Saturation point reached at departments/ agencies (e.g., DRDC).
  ▪ Need for 2 depts. to be involved in projects exacerbates the shortfall.
  ▪ Projects often not submitted because of lack of management capability/capacity.
▪ Not always an infrastructure issue (x3).
  ▪ Funding for equipment vs. people.
  ▪ Need bodies with brains i.e., S&T expertise and knowledge.
▪ Budget is small compared to other countries (x1).
▪ Hidden costs may undermine CRTI (x2).
▪ Effort from cluster members, projects, departments, agencies.
▪ Too involved in "heavy science", not 1st Responders (x1).
  ▪ "High science."
▪ No link seen (or hard to identify) between funded CRTI projects and long-term plans and priorities for departments (x19).
  ▪ Sustainability issues, long term "ever-greening."
  ▪ Not all labs are equal.
  ▪ What Sustainability has been achieved?
	▪ Onus is on a few departments to support CRTI activities, from both the project and the cluster perspectives.
	▪ For R&D projects, 2 departments/agencies are required to participate. The original intent was to promote collaboration, but a side effect was that 2 or 3 departments were consistently asked to participate in projects, which added to their workload.
	▪ Funding to date has focussed on building capacity in terms of infrastructure. This has introduced sustainability concerns on two fronts. First, departments need to build the O&M costs into their ongoing budget cycles. Though projects will sometimes fund this for a period of time (post-implementation), eventually departments need to take this over. Second, there needs to be ongoing knowledge and expertise to operate the equipment, run the tests, etc. There isn't a way to fund PYs for CRTI projects—CRTI isn't an employer or contracting organization in this respect.
	▪ A mechanism is needed to fund project resources. CRTI needs to work with departments to find ways to keep some people to retain knowledge/expertise, and a given level of capability (succession planning?).
	  ▪ This is part of a broader, government-wide issue.
	▪ Sustainability is a key issue going forward. Departments and others in the operational community need to take up the knowledge/ equipment developed from CRTI-funded projects. Therefore, their O&M budgets need to reflect new O&M costs (if any).
		▪ Review the need for 2 departments to participate in R&D projects.
		  ▪ Investigate alternative structures to ensure collaboration continues.
		▪ Investigate mechanisms to fund people, to support projects and other activities—i.e., sustainment of S&T expertise and knowledge.
		▪ Review proposal submission criteria to include:
		  ▪ Links to departmental/agency long-term plans and priorities; and
		  ▪ Demonstrated plan to sustain equipment or personnel, post-project.
		▪ Explore root cause and options to address department commitment to CRTI project results (technology and equipment) in long-term strategy and plans.

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CRTI Mandate and Governance Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Resource Constraints (cont'd)		
▪ Departmental pressures keep projects from achieving CRTI objectives (technology at end of project). ▪ Need to understand where receptor capability is (tech push vs. pull).	▪ Where do the projects fit within departmental (operational community) capability plans—what is needed for each to develop and evolve? How does this get reflected in CRTI project selection? ▪ These questions need to be addressed for CRTI to support capability-based plans.	
Stakeholders		

▪ Need to look at governance (CRTI mandate and governance framework) and PSEPC involvement (x2).
  ▪ CRTI and PSEPC role clarification.
  ▪ Canadian Response Strategy.
▪ Clarify role "Center for Science & Technology" (oversees CRTI).
  ▪ Only visibility is S&T community.
▪ Need for intelligence re. bio-terrorism—PSEPC not provided any.
▪ No formal link with programs in other departments.
▪ Shift focus to 1st Responders and OAs.
▪ Where/who are 1st Responders?
▪ Difficult to get buy-in from 1st Responders when results are long term (far in future) (x1).
  ▪ Adherence to the fiscal year.
▪ Need to push the envelope outside of the NCR.
▪ Push towards industry partners, not 1st Responders.
▪ Gap is with 1st Responder response not technology.
▪ Need to better engage academia.
	▪ Lack of fully developed ("mature") national security objectives impacts CRTI, as the interactions between CRTI and other departments/agencies are unclear—there may be new interactions or interactions may be stopped or changed.
	  ▪ This includes understanding and identifying what CRTI provides to other organizations and what CRTI receives from other organizations.
	▪ More input is required from 1st Responders.
	  ▪ Identify near term or immediate needs for equipment, other support.
	▪ Rate of adoption (for new technology) is not as expected.
	▪ Canadian industry participation is dependent on potential marketability of new products (nationally and/or internationally).
	▪ Need to expand involvement of P/T/M operational communities within the jurisdictional limitations. Focus has primarily been on federal community. To build capability other jurisdictions need to be aware of and/or participate in CRTI.
		▪ Leverage participants' existing inter-jurisdictional agreements and arrangements to more fully build S&T capability and capacity.

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Call for Proposals		

▪ Priorities were clear in Call for Proposals (x3).
  ▪ Easy to hone in on what CRTI was looking for.
▪ Communication when priorities changed over a year.
  ▪ Not aware of priorities.
▪ Not clear what CRTI is looking for? (x4).
▪ Link between gaps and capability.
  ▪ People involved in risk assessment not always well versed in the problem.
▪ Gaps selected and not the important ones.
▪ Project mix appears balanced.
▪ Risk assessment good for R&D projects.
▪ Need a common language. Terminology isn't always clear (x1).
  ▪ Document that identifies target areas/ priorities hard to understand (language).
▪ Definition of project categories—some projects may fall between the cracks.
  ▪ E.g., no longer R&D, but not yet Tech Acceleration.
▪ Liked the one-day proposal workshop at beginning of program (x4).
▪ Proposal workshop needs to consider people from outside NCR.
  ▪ Travel for one day is not always feasible.
▪ Too many areas under which to submit proposals.
  ▪ Move to correct stream before rejecting.
▪ Research themes in the Portfolio.
▪ Not flexible.
▪ Too many projects in a category.
	▪ Overall, the CRTI was seen to have a balanced mix of projects.
	  ▪ Ongoing challenge will be to maintain a balance.
	▪ Mixed reviews on clarity of process—knowledge of the process has been lost or forgotten.
	▪ Knowledge of the process and understanding key terms is seen as a key contributor to a proposal's success.
	▪ An annual workshop to review the process, criteria, changes from previous year, etc., would be beneficial; however, needs of people outside the NCR should be considered re. timing, duration, etc.
	▪ A few comments regarding the lack of clarity around project categories were received. Submitters are sometimes unsure which category a project fits into.
	  ▪ Similarly, follow-on projects may fall through the cracks, as it's no longer an R&D project, but not quite a Tech Acceleration project.
	▪ No facility/mechanism to carry or "direct" a project through its transition from R&D through to Tech Acceleration.
	▪ Shift towards directed funding may be needed. If so, this will impact the call for proposals. E.g., not as many can be funded, a new category is introduced, or changes the risk assessment and/or prioritization criteria.
		▪ Schedule and hold an annual bidders conference to review the process, current priorities, changes from the previous year, and to answer any questions from potential bidders.
		  ▪ Clearly distinguish between R&D, Tech Acceleration and Tech Demonstration projects.
		  ▪ Need to consider those outside the NCR; therefore, some alternate methods (e.g., webex/video conference) should be investigated.
		  ▪ This will be particularly important the first year of the new funding cycle, as CRTI incorporates capability-based planning and response.
		▪ Review call for proposal and related documentation to ensure a standard use of terminology.
		▪ Incorporate a stronger emphasis on multi-use S&T for proposals.

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CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Proposals		

▪ Lessons learned: Industry partners have the right skills/experience to deliver.
▪ Synopsis phase is good (x1).
▪ Worked well (X2).
  ▪ Fair.
  ▪ Well organized.
▪ Team approach (x1).
  ▪ Better planned projects.
  ▪ Forces team to think ahead about what they are going to do.
▪ Workload to develop is very heavy (X10).
  ▪ Complicated, repetitive.
  ▪ Questions were indirect.
▪ Easier with knowledge of process.
▪ Process takes a while to get up to speed (x2).
  ▪ Need to understand process and language.
  ▪ Can be overwhelming if there are many partners.
  ▪ No more onerous than other funding sources.
▪ Straightforward for Tech Acquisitions.
▪ Time to prepare proposals underestimated (x2).
  ▪ Proposal time is very tight (x9).
  ▪ Start to write proposal assuming synopsis will be accepted.
  ▪ Need more time to forge partnerships.
  ▪ Involvement of legal department may introduce delays (e.g., to create partnerships).
▪ Sometimes hard to describe technical issues in a fixed space on template (x2).
▪ Hard to substantiate follow-on work.
	▪ Project champions and managers need to carefully evaluate the abilities of their partners to deliver S&T. Do they have a track record? What is the depth of knowledge/experience within the firm?
	▪ The team approach to developing the proposal resulted in better-planned and organized projects.
	▪ Though some found the process too rigorous, others indicated that it's no more onerous than other sources of funding. Knowledge of the process was cited as a contributing factor to successfully navigate the process.
	▪ Many found the turn-around time for the proposal (from synopsis phase) very tight, with some starting the proposal soon after the synopsis was submitted (assumed the synopsis would be accepted). Others indicated it conflicted with year-end activities.
	  ▪ CRTI Secretariat indicated that this had changed 2 years ago. The proposal is now due in September, and the Charter is due by March 31.
	▪ Perception that "new" work is preferred over follow-on work. This may be a result of the changes in priorities from year to year. It is recognized that CRTI needs to fund new work, but that (perhaps) follow-on work projects also need to be continued. Shifting towards targeted/ directed funding would help ensure that some projects don't get "lost."
		▪ Continue to provide lessons learned to potential bidders. This can be provided in the Call for Proposals document, and reinforced during the bidders conference. Key lessons include:
		  ▪ Ensuring partners have appropriate track record in delivering similar projects (i.e., expertise is not vested in one or two key individuals); and
		  ▪ Using a team approach to project planning.
		▪ Review partnering arrangements in terms of time available to set up.

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Proposals (cont'd)		

▪ Proposals closely align to department mandate (where department is sponsoring/submitting the proposal) are more successful.
▪ Timing conflicted with year-end activities.
  ▪ Proposal writing comes in at end of the year.
  ▪ Perception that new unrelated projects are preferred.
▪ Inhibits new ideas.
▪ A bit bureaucratic.
▪ Wording of proposals is important to success.
▪ Need both a focused and broad approach.		

Project Selection		

▪ Open and transparent selection (x1).
  ▪ Projects are evaluated on merit.
▪ Peer review is good (x2).
▪ Feedback provided post-review is good (x2).
▪ Selection criteria is clear.
▪ Templates very prescriptive.
▪ Good, timely process.
  ▪ Informed if synopsis passed.
  ▪ Finds it easy to match projects to gaps.
▪ Criteria need to be refined.
  ▪ What is the role/function of the criteria?
▪ Always change minds.
▪ Bias to technical solution not operational solution.
▪ How to identify projects that will most likely progress to Technology Demonstrations and beyond?
	▪ In general, the selection process was seen as open and transparent; however, specifics of the process were questioned (e.g., evaluation criteria, decision-makers, etc.).
	  ▪ Knowledge/awareness of this process may have been lost over time.
	  ▪ Needs to be additional/continuing communications regarding the process, changes to the priorities, etc.
	▪ Ongoing tension between need for R&D and need for "products." Long term vs. short term, technical vs. operational solution.
	  ▪ Moving to a capability-based model will not ease this tension. It will likely do the opposite, shifting emphasis to near or mid-term needs of the operational communities, and away from R&D.
	  ▪ This may result in decreased involvement and engagement of some participants.
		▪ Investigate allocating a percentage of the total project budget to each type of project.
		▪ Investigate mechanisms to enable directed or targeted funding for certain projects.
		  ▪ Develop method to identify & select areas for directed funding, and to scope projects.
		▪ Minor adjustments to the project selection process are required going forward:
		  ▪ Include evaluation & selection process in the bidder's conference.
		  ▪ Review evaluation criteria and consider adding two new criteria: contribution to departmental/agency plans & priorities, and inclusion in O&M plan (post-project).

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Project Selection (cont'd)		

▪ Ignore long-term projects in favour of short-term projects.
▪ Review and selection.
  ▪ Labour intensive.
  ▪ New approach for the future is being introduced.
▪ Selection needs to consider expertise/ability of those on project teams (x1).
▪ An approved project cannot be started in year $$ given. Instructed to re-apply, but lost funding.
▪ Use of priorities and gaps to determine technical acquisition funding (OAG report) (x1).
  ▪ What is the best way to fill gap?
  ▪ Did equipment go to the right labs?
  ▪ How will labs work together and use acquired technology in an emergency?
  ▪ Not well defined.		

Project Management		

▪ Pushed to spend money before they were really ready to proceed (x1).
▪ PWGSC is involved early on—this is good.
▪ Project charter and reporting brings structure and clarity (x2).
  ▪ Clear and results-oriented.
  ▪ Built in framework for PMs.
▪ Reporting straightforward (x2).
  ▪ Reasonable level.
  ▪ Easy to get done (once set up).
  ▪ Not too onerous.
	▪ Though the project management discipline was seen as necessary, the level of rigour was questioned.
	▪ Some organizations are on the low end of PM capability and maturity; as a result, there is a steep learning curve when executing a CRTI project.
	▪ Support from Project Champions, Portfolio Managers, and the Secretariat was available.
	  ▪ Some pointed out that their questions regarding documents weren't being answered (or they were pointed back to the document they were questioning).
		▪ Maintain level of PM discipline and rigour.
		▪ Investigate ways to provide additional support to participants with a lower PM capability/maturity. E.g., providing PM coaching.
		▪ Ensure proper handovers are conducted when someone takes over a Project Manager or Project Champion role.
		  ▪ Review circumstances when a Project Charter is required to be updated and re-signed and identify opportunities to reduce number of instances.

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CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Project Management (cont'd)		

▪ Generally projects are well managed (x5).
  ▪ "Tight" management.
  ▪ PM discipline.
  ▪ Accountability is good.
▪ Annual Project Review Committees (PRC) are helpful.
▪ Supports are in place (x10).
  ▪ Mechanisms to raise/discuss project problems/issues with CRTI members.
  ▪ Good support from Project Champions and Portfolio Managers.
▪ Transfer money to lead departments up front (x1).
▪ Experienced PM resource helps (x1).
▪ Program flexibility helps (x1).
▪ Time management & commitment—heavy requirements (x7).
▪ Underestimate time requirements to prepare reports.
▪ Tracking of in-kind contributions (e.g., where bodies (PYs) provided) (x3).
  ▪ Lack of auditing trail of "in-kind" (x2).
▪ CRTI staff turnover has caused some issues.
▪ Management of "in-kind" (x3).
  ▪ No charge-out rates for people/facilities in federal gov't.
  ▪ Time tracking not done well.
▪ Reporting forms do not work properly.
▪ Quarterly report (x6).
  ▪ Too much work.
	▪ Tracking of in-kind contributions is poorly done due, in part, to:
	  ▪ In-kind contributions are only tracked for projects and exercises and not for other Cluster activities.
	  ▪ Inconsistent time tracking by project team members.
	  ▪ Lack of a standard cost for people, equipment and facilities.
	▪ Staffing is an issue.
	  ▪ Hard to hire people and after the contract ends, the organization faces a loss in terms of skills and knowledge.
	▪ Roll-over of funds viewed as beneficial—allowed projects to address delays (e.g., purchasing equipment, hiring staff).
	▪ Not all organizations can afford a full-time project manager.
	  ▪ Need to ensure that the expected time & effort for part-time project managers is realistically reflected in project plans and schedules.
	▪ Handovers to incoming project managers and project champions were not always done, nor done well.
	▪ Ongoing co-ordination challenges with multi-partner teams.
	  ▪ It was suggested that instead of all participants being partners, there be fewer partners, and the remaining participants have a different relationship.
	  ▪ Need to ensure participants get information to the PM (or PMO) in a timely manner.
		▪ E.g., if a roll-over has occurred, does the Charter need to be re-signed by everyone, once the project plan and schedule have been revised.
		  ▪ Investigate alternative methods (e.g., can participants provide a proxy to the lead department in certain circumstances).
		▪ When creating teaming arrangements establish standard costs for people, equipment and facilities for use in tracking in-kind contributions to projects, exercises and cluster activities.
		▪ Investigate mechanisms for hiring people for the entire CRTI funding period and methods to assign the resource from project to project.
		▪ Work with DND to ensure CRTI ability to roll over funds continues.

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Project Management (cont'd)		
▪ Departments/systems capture data differently. Hard to track and reconcile. ▪ Hard to get partner input. ▪ Too much paperwork (x3). ▪ A lot of reporting for value of funding (size of some projects). ▪ Work effort in revising & signing the Charter is considerable (3). ▪ When is this really required? ▪ Can delay funding in multi-year projects, because you need to revise charter with new milestones for next FY, also to support roll-over of funds. ▪ Staffing. ▪ Funding PYs from CRTI (x5) is an issue. ▪ Slow to get funding to hire or to extend. ▪ Loss of expertise (after contract ends). ▪ PWGSC (x7). ▪ Low support when contracting partners. ▪ Contracting slow. ▪ Poor timing for receipt of funds (end of year). ▪ Roll-over requirement (x11). ▪ Transfers risk to Project Champion. ▪ Equipment purchase can introduce delays (e.g., customs, co-ordination through other agencies/departments). ▪ Need flexibility for R&D (R&D milestones do not necessarily fit into a fiscal year) (x1). ▪ Project requirements underestimate the value of "think time" (x3). ▪ Expectation times for R&D projects too "tight."	▪ Need to ensure the right people are at the table for PRCs—background and knowledge of the project is needed.	

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Project Management (cont'd)		

▪ Inconsistent use of a Project Manager (x2).
  ▪ Not all labs can fund.
  ▪ Depts. may not have sufficient PM discipline and skills.
▪ No streamlined way to capture lab data.
▪ Availability of Portfolio Manager was mentioned as an issue by some.
▪ Conflict of financial reporting with year-end activities (x3).
  ▪ Can encounter difficulty getting financial information in time.
▪ Co-ordination a challenge with geographically dispersed team (x5).
  ▪ At year-end particularly.
  ▪ Co-ordination of schedules and meetings with many partners can be very difficult.
▪ Handovers to new Project Champions or Project Managers not always done (x1).
▪ Approach.
  ▪ Steep learning curve for scientists, others.
  ▪ Learning curve also for new PMs.
▪ PRCs not working well.
  ▪ Level of person involved—directors not knowledgeable about project—therefore waste their time.
  ▪ Secretarial involvement—hard to get approval/signoff.
▪ Close out report not appropriate vehicle to capture project knowledge.		

ANNEX A

CRTI Operating Framework		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Project Management (cont'd)		
▪ Project results handled differently. ▪ Where do they go and how captured? ▪ Not always clear to sponsoring dept or PM how the project actually contributed to closing of gaps, etc.		

ANNEX A

Knowledge Management/Communications		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**

▪ Exercises are well received (x2).
  ▪ Lessons learned in terms of operational authority and execution of response plans.
  ▪ Want more exercises held.
▪ Jurisdictional issues need to be resolved before exercise can be conducted.
▪ Initial awareness with 1st Responders (x1).
  ▪ Increasing in some areas.
  ▪ Provided in some cases through projects.
▪ Need major education program for 1st Responders (x3).
  ▪ Need to be told about the portal.
  ▪ Knowledge transfer, training between S&T labs and 1st Responders.
▪ Targeted communications and open to a limited number of people.
▪ Knowledge Mgmt and communications well done (x13).
  ▪ Symposium (x9).
  ▪ Newsletters/Project Book (x2).
  ▪ Electronic library/portal.
▪ Require clarity on who's required to present at summer symposium.
▪ Should appear in project as an activity/task.
  ▪ Expectation only. Not mandatory.
▪ Community liaison not well done.
  ▪ Increase visibility to public, provinces, "ground troops."
  ▪ Improve KM/Communications to external parties.
  ▪ Low familiarity with portals (PMs).
	▪ Communications is an ongoing challenge for CRTI. With CRTI participants and personnel changing regularly, and an expanding network of stakeholders, ensuring a consistent level of awareness and understanding about CRTI is increasingly important.
	  ▪ More effort is required to support communications re.
	  ▪ Projects
	  ▪ Clusters
	  ▪ CRTI
	▪ Symposium, 1st Responders Day, and project booklet are seen as the best way to share information and knowledge of what's going on in CRTI (project perspective).
	▪ Portal received mixed reviews, with some indicating that it is hard to navigate and find information.
	▪ There appears to be a disconnect regarding attendance at Symposium—some project managers were not aware if it is mandatory or just expected.
	▪ Minimal exposure outside the federal S&T community.
	  ▪ Public has minimal awareness of the program.
	  ▪ Academia and private organizations, as well as broader P/T/M stakeholders, have lower levels of awareness.
	  ▪ Some P/T/M organizations are involved in Clusters. Some 1st Responders have been involved in projects (usually the testing phase) and in exercises.
		▪ The communications plan should be expanded to increase the number of activities required:
		  ▪ Re-set the expectations and understanding of CRTI with existing participants.
		  ▪ Establish awareness within new stakeholder groups (e.g., operational community, 1st Responders).
		  ▪ Increase awareness in other stakeholder groups (e.g., P/T/M, academia, private industry, public).
		  ▪ Support Cluster activities.
		  ▪ Ensure participants are aware of the portal and the information contained.
		▪ Review portal structure and identify ways to facilitate navigation.

ANNEX A

Knowledge Management/Communications		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**

▪ Portal cumbersome to navigate.
  ▪ Buy-in not visible from everyone.
▪ How is knowledge gained from a project presented?
  ▪ Project results handled differently.
  ▪ Where do they go and how captured?
  ▪ Close-out report not appropriate vehicle to capture project knowledge.
▪ Publication of results (with CRTI approval).
▪ No formal network to share info gathered at international conferences.
	▪ Project results and knowledge gained from projects are not seen as well handled. How is this information captured, disseminated and maintained?
	▪ Interviewees were not aware of a mechanism to share CRTI-related information from international conferences attended as part of their “day job.”
	  ▪ Where, who, how is this information collected and sent to interested parties?	

ANNEX A

Lab Clusters		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Organization & Membership		

▪ Different levels of departmental buy-in to participate in Clusters.
▪ CRTI MOU does not include reference to Cluster activities.
▪ People/departments in Clusters are closest to OAs.
  ▪ Some have 1st Responder and support roles within the department/agency.
▪ Some clusters have OAs involved.
  ▪ Know how departments are positioned to respond to events and their gaps.
▪ Some clusters don't have the OAs involved in their action plans (x8).
▪ Exercises conducted in a vacuum.
  ▪ Fit with 1st Responders.
  ▪ At what point(s) does a cluster provide info that is put into an OA's response plan?
  ▪ Where do clusters plug into response plans (OA)?
▪ CFIA Food Inspectors are 1st Responders and are not engaged in CRTI.
▪ Good will of participants.
  ▪ Participants and eager to be involved.
▪ Require more interaction with 1st Responders/ groups/representatives.
▪ Value from CRTI but perhaps not what was envisioned.
▪ Cluster lead has no formal authority for members (x2).
	▪ The CRTI MOU does not explicitly state expectations regarding Cluster activities, which may impact the level of departmental support received by Cluster leads and members.
	▪ Some Clusters have 1st responders within their organization. Therefore, how they manage and carry out their "cluster" and "responder" roles needs to be thought out.
	▪ Very effective in establishing networks and initial technology acquisition projects' success.
	  ▪ Ongoing challenge to maintain networks; new labs joining, others leaving, personnel changes (within the labs), etc.
	▪ Success is largely dependent on the good will and commitment of Lab Cluster members.
	▪ Minimal interaction with 1st Responders or OAs to define how the cluster should interact (with them) during an event.
	▪ Working relationships at the federal S&T level have been created and strengthened as a result of CRTI.
	▪ Stronger, clearer understanding of lab capacity and capability.
	▪ Focus on certain gaps and building capacity resulted in some disciplines not being as engaged as others (e.g., "plant" health within BIO).
	▪ Minimal focus, to date, on pan-cluster activities and interactions.
		▪ Continue efforts to maintain the Lab Cluster networks, as well as their capacity/capability "gaps."
		▪ Obtain endorsement of Cluster participation from departments/agencies (through MOU).
		▪ Explore ways to involve labs at other levels of government (P/T/M), as well as members of the operational communities (1st Responders).
		▪ Ensure proper handovers are conducted to new Cluster leads.
		▪ Conduct additional exercises to test each clusters Technical Advisory Plan, as well as to test pan-cluster interactions and activities.

ANNEX A

Lab Clusters		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Organization & Membership (cont'd)		

▪ BIO cluster.
  ▪ Missed "plant health" side of things.
  ▪ Not funded as much as animal/food.
  ▪ Low priority.
  ▪ Not engaged in cluster/CRTI as a result.
▪ Need recognition of difference between clusters.
  ▪ E.g., BIO: plant, animal and food is very different.
▪ How to manage overlaps among clusters.
▪ Clusters at different stages of maturity (x1).		

Cluster Outcomes/Objectives		

▪ "Surge" capacity exists/created for labs.
  ▪ Now they are up to speed.
▪ Clusters provide a forum to network, build relationships (x3).
  ▪ Network of labs, not clusters of people.
▪ Recognized need to cross-cluster projects and exercises.
  ▪ Working to fill these gaps.
▪ Ability to marry projects with needs differ among Clusters.
▪ Difficulty in understanding cluster's raison d'être, going forward (x1).
▪ Competition within Cluster for part of the purse ($$).
▪ Little or no awareness of cluster activities and roles by project managers (x1).
▪ Hard to identify what has been done, or what is being done, internationally and by whom.
	▪ Lab Cluster objectives are not clearly articulated—in either the framework or the RMAF.
	  ▪ Outcomes are defined in terms of activities.
		▪ Review and confirm the objectives and outcomes for clusters.
		  ▪ Approach to achieving each objective may differ by cluster.

ANNEX A

Lab Clusters		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Cluster Roles & Responsibilities		

▪ Labs in cluster not necessarily co-located to deal with BIO samples.
  ▪ Each lab needs specific skills.
▪ Human and animal health—different procedures/standards/protocols.
▪ Saturation point at Cluster level.
▪ Little communication from Lab Cluster (x1).
▪ Additional work will be required going forward to keep track of labs (and expertise) in clusters (x1).
  ▪ New labs, joining, some leave, departments reorganizing, etc.
▪ Labs have different perspectives on creation of "Standards/Certification/Accreditation" role (x7).
  ▪ Want to create standards, provide advice.
  ▪ Don't want to certify equipment.
  ▪ Whoever "owns" standards/certification lab should represent all GoC and 1st Responders.
  ▪ Liability issue if they "recommend" one product over another.
	▪ Original expectations regarding ability to fulfil role/responsibilities were likely too high. In hindsight, the work effort and resources required were under-estimated.
	▪ There is a need to review Cluster roles and responsibilities to ensure they have the resources to carry them out and that they are the appropriate mechanism to carry out certain roles.
	  ▪ Specifically, Labs want to be involved in developing standards, but they don't want to be the certifying authority.
		▪ Review and confirm the roles and responsibilities for each cluster.
		  ▪ Consideration should be given to the estimated work effort and level of resources available to clusters.
		▪ Specific discussion needs to be had in the area of standardization, standards and certification. A key requirement to accelerate technology into the hands of the 1st Responders is certification of equipment. While labs and Lab Clusters have a role in this area, it is unclear which organization(s) should be responsible for testing and certification.
		  ▪ Once identified, these organizations will need to be involved in the CRTI, either as part of projects, or as stakeholders.

ANNEX A

CRTI Ongoing Risks and Challenges		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Exploitation		

▪ To whom do they hand over "products"? (x5)
  ▪ What's next after a technology is successfully demonstrated or prototyped?
  ▪ Where does the R&D go?
  ▪ Where does the technology go?
  ▪ Exploitation of project results?
  ▪ Products already on the market by the time a project is completed.
▪ 2–3 year timeframe to market.
	▪ To date, four projects have resulted in commercial products. The take-up rate for products needs to increase.
	▪ A more focussed approach is needed to ensure technology/knowledge gets to the hands of 1st Responders and other operational communities.
	  ▪ Identification of projects to push through to Tech Acceleration/Demonstration.
	  ▪ Targeted or directed funding may be required to ensure identified projects are funded through to Tech Acceleration, to ensure specific capabilities/capacities are created for 1st Responders, and/or to ensure specific gaps are addressed.
	▪ Similarly knowledge needs to be exploited within the stakeholder community.
	▪ General agreement that CRTI needs to move to a capability-based planning model, but there are differing opinions on what this actually means and how this should be implemented.
	  ▪ Concern that CRTI may overlap with departmental jurisdictions (OAs). This underscores the need for clearly defined interactions between CRTI and other stakeholders.
		▪ Investigate mechanisms to target/direct funding to those projects that will result in prototypes/ proof of concept technology and equipment.
		▪ Strengthen current methods of informing operational communities of prototype technology/products.
		▪ Continue to strengthen cluster relationships with operational communities, through exercises and co-ordination of response plans.
		▪ In conjunction with operational communities (at all jurisdictions), investigate additional measures or mechanisms to ensure technology/knowledge is exploited within the operational community.
		  ▪ Leverage existing arrangement and agreements between federal and P/T/M organizations.
		  ▪ Support operational communities in assessing current capability/capacity.
		  ▪ Involve them in training/exercises.

Sustainability		

▪ CRTI needs to evolve.
  ▪ Capability planning (x2).
  ▪ New category of projects.
▪ Different funding model to drive departmental capability.
▪ Testing of equipment needs to be addressed.
	▪ Capability and capacity, through Tech Acquisition projects, have been created over the past 5 years. Departments/agencies need to ensure that they build additional costs (if any) into their O&M budgets to maintain that level of capability and capacity. This includes skilled resources to use the new equipment.	▪ A departmental resource forecast/plan to build and maintain S&T knowledge and expertise in identified CBRN areas is needed.
		  ▪ CRTI can support and influence this through the clusters and through the SC membership.

ANNEX A

CRTI Ongoing Risks and Challenges		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
Sustainability (cont'd)		

▪ What sustainability has actually been realized?
▪ "Sustaining" knowledge/expertise (x2).
  ▪ Developing and maintaining S&T knowledge and skills within Canada/GoC departments and agencies.
▪ Project personnel gain the knowledge.
  ▪ Goes when they leave because department can't fund a PY.
	▪ The R&D, Tech Acceleration & Tech Demonstration projects have also built capability/ knowledge within the project team. To support full exploitation of project results, this knowledge needs to be kept or transferred.
	▪ Key issue is ongoing sustainability for broader S&T CBRN knowledge management.
	  ▪ Project personnel are contracted and will leave with that knowledge (loss of capability).	

National Security & Response		

▪ Absence of overall Canadian Response Strategy is a BIG limitation (x1).
  ▪ Bottom up from S&T delivering CBRN response.
  ▪ Ongoing tensions.
▪ CRTI needs to be a catalyst.
  ▪ To look at how they (OAs) respond to incidents.
  ▪ To look at how the response will unfold.
▪ Need for Balanced Portfolio of Projects (x4).
  ▪ Capability vs. capacity.
  ▪ R&D vs. technology.
  ▪ Long term vs. short term.
▪ Operational mandates/roles.
  ▪ Give roles to those with capability.
  OR
  ▪ Give capability to those with roles.
▪ Disparities across provinces (resources).
  ▪ Willingness to share info.
  ▪ Some are too insular.
	▪ An overarching national security framework is needed to ensure full response capability. Lack of a mature framework creates a level of ambiguity as to where CRTI "plugs into."
	  ▪ For full response capability, the inter-relationships and "handshakes" between CRTI and other participants in the national security framework need to be well articulated. This includes understanding the inputs provided to CRTI from other organizations and the outputs provided by CRTI to other organizations.
	▪ Fuller understanding of this national response capability will likely impact the portfolio of projects. Understanding the broad response capability and capacity may increase the priority in certain areas.
	▪ "National response" implies more than a federal level of response—it implies a co-ordinated, multi-jurisdictional response strategy and plan.
	  ▪ CRTI is in a unique position to start (or continue) dialogues with other jurisdictions to build the network and co-operation needed to work together.	

ANNEX A

CRTI Ongoing Risks and Challenges		
Information Gathered	**Findings/Analysis**	**Proposed Areas for Improvement or Areas of Opportunity**
National Security & Response (cont'd)		
	▪ This can be accomplished by leveraging stakeholders' contacts, existing arrangements (e.g., MOUs, agreements, etc.).	

ANNEX B—OAG APRIL 2005 REPORT REFERENCES

OAG Report References, Questions or Findings	
Relevance/Applicability of OAG Reference or Observation	**Cross-Reference to Evaluation Results**
Page 21 Section 2.103—Within the context of an overall CRBN national response strategy, OAG Report indicates there is an absence of an effective governance regime at the national level (Page 18 Section 2.89), and departmental response plans are vague regarding how they would link together to form a coordinated federal response.	
▪ Observation does NOT reflect on CRTI directly, but only serves to reinforce the importance of the need to evolve the national response strategy beyond what has occurred since the report was published, and work towards coordinated departmental response plans.	▪ Response to Evaluation Question #1 on page 14/39 (bullet #2) refers.
Page 22 Section 2.106—CRTI is specifically mentioned as a program to enhance the capacity of federal agencies to respond that would contribute to improving the national capacity to respond.	
▪ Observation not only recognizes the need and contribution of CRTI to the enhancement of the national capacity but also that CRTI exists within a broader national framework.	▪ Response to Evaluation Question #1 on page 14/39 (bullet #2) refers.
Page 27 Section 2.134 to 2.137—OAG Report identified the funding for the 3 CRTI priority areas and the threat/risk assessment that provided identified gaps in federal laboratory capacity that lead to establishment of Lab Clusters. Regarding the funding allocated to technology acquisition projects, the specific question was posed, "but how all the labs will work together and use this technology in an emergency has not yet been clearly defined."	
▪ It is suggested that this question presents the need for specific outcomes measures that will clearly demonstrate the value of the funding and effort expended on technology acquisition projects.	▪ Evaluation Question #6 on pages 33/39 and 34/39 refers.
Page 28 Section 2.138—"The number of departmental response plans and the inconsistencies among them created problems for the laboratories in working together. They identified a tension between working together and supporting their operational plans."	
▪ OAG reference to tensions and/or conflicts of interest between Lab Cluster roles and home department roles was directly substantiated by at least four interviewees and indirectly by a number of others. ▪ One root cause of these tensions is that Lab Cluster activities are not recognized in the CRTI MOU, which can be interpreted as lack of departmental support. A second root cause is that the listing of Lab Cluster roles and responsibilities without clear objectives can appear to be in opposition to departmental operational roles.	▪ Response to Evaluation Question#1 on page 14/39 and Evaluation Question #6 on pages 33/39 and 34/39 refers.

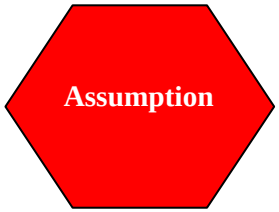
ANNEX B

OAG Report References, Questions or Findings	
Relevance/Applicability of OAG Reference or Observation	**Cross-Reference to Evaluation Results**
<u>Page 28 Section 2.139 and 2.140</u>—OAG Report states that the analysis leading to the consolidated risk assessment methodology was adequate and highlighted that CRTI is not designed or mandated for mass distribution of technology to 1st Responders.	
▪ In the absence of the evaluation team having access to the CRA document, the OAG Report provides some measure of objective substantiation vis-à-vis the CRA. ▪ Report also reinforces that the CRTI mandate does not include mass distribution of technology to 1st Responders; however, beyond indicating a smaller allocation of funding for the purchase of CBRN equipment, it does not suggest how the further exploitation would take place.	▪ Response to Evaluation Question #1 on page 12/39 indicates that the OAG report considered the CRA methodology to be adequate. ▪ Response to Evaluation Question #1 on page 16/39 refers to the distribution of technology reference.
<u>Page 30 Section 2.156</u>—"Equipment guidance is lacking" and that "CRTI and CTTC had begun discussions on how to conduct testing and evaluation of CBRN equipment and technologies."	
▪ OAG observation is not a criticism of the CRTI Program. It simply reiterates the requirement under the broad heading of providing CBRN equipment to 1st Responders. At Section 2.161, report indicates that CRTI and PSEPC will provide support for the building of a Counter-Terrorism Technology Centre (CTTC) in Suffield for use by the 1st Responder community, governments and industry. ▪ Report also indicates that CRTI and CTTC had commenced discussions in October 2004. There is no additional progress to report for the formative evaluation.	▪ Response to Evaluation Question #2 on page 19/39 and on page 21/39 (bullet 8) refers.

ANNEX C—RESULTS CHAIN ORIENTATION & CRTI RESULTS CHAIN[6]

Annex C provides an introduction to results chain components and orientation to the CRTI RC V013 of 16 March 2006.

Description of Results Chain Components

Results Chain Component	Component Description
	Initiatives are the actions/business investments that contribute to the realization of outcomes. On a final Results Chain model, these business investments/initiatives will include all SMS IT Projects (which will provide specific capabilities to the program) and all associated business-related and transition planning initiatives.
	Outcomes are the results associated with initiatives. There are two types of outcomes, namely intermediate and final. The final outcomes are shown in green on the right hand side of the model and are circled as the business case. These will depict the SMTP key results or final business outcomes. The remainder of the outcomes shown in yellow on the model are intermediate outcomes that contribute to other intermediate outcomes and to at least one of the final outcomes. It is important for business results/outcomes to be clearly defined and measurable.
	Assumptions represent uncertainty and/or conditions that are prerequisite to achieving the targeted/final outcomes. An assumption represents a **risk** or probability that the desired business results may not be achieved; however, part of the risk analysis is to assess the impact of these risk areas and to develop risk mitigation plans as appropriate. If a particular assumption is not within the control/purview of CRTI then it presents a risk to the program and needs to be continually monitored and action taken when necessary.
Contribution 	Contributions represent the role one component plays in the realization of another component.

[6]

ANNEX C

CRTI Results Chain Orientation

Evaluation Results that are substantiated by the CRTI Results Chain model are briefly discussed in the respective Evaluation Results section of this report.

The following describes, at a high level, the components of the vertical sections of the model from left to right: (note that a legend is provided at the bottom right corner of the attached results chain model).

- ***CRTI Vision/Mandate***—depicts the CRTI Program overall mandate, vision and mission which was taken directly from the CRTI Framework document dated May 2002.
- ***CRTI Program S&T Capability/Capacity Interim Results***—depicts how the CRTI Program achieves and contributes to its anticipated final outcomes which are shown in the second column from the right. The model is not intended to be a process model nor is it intended to depict sequence or time dependence.

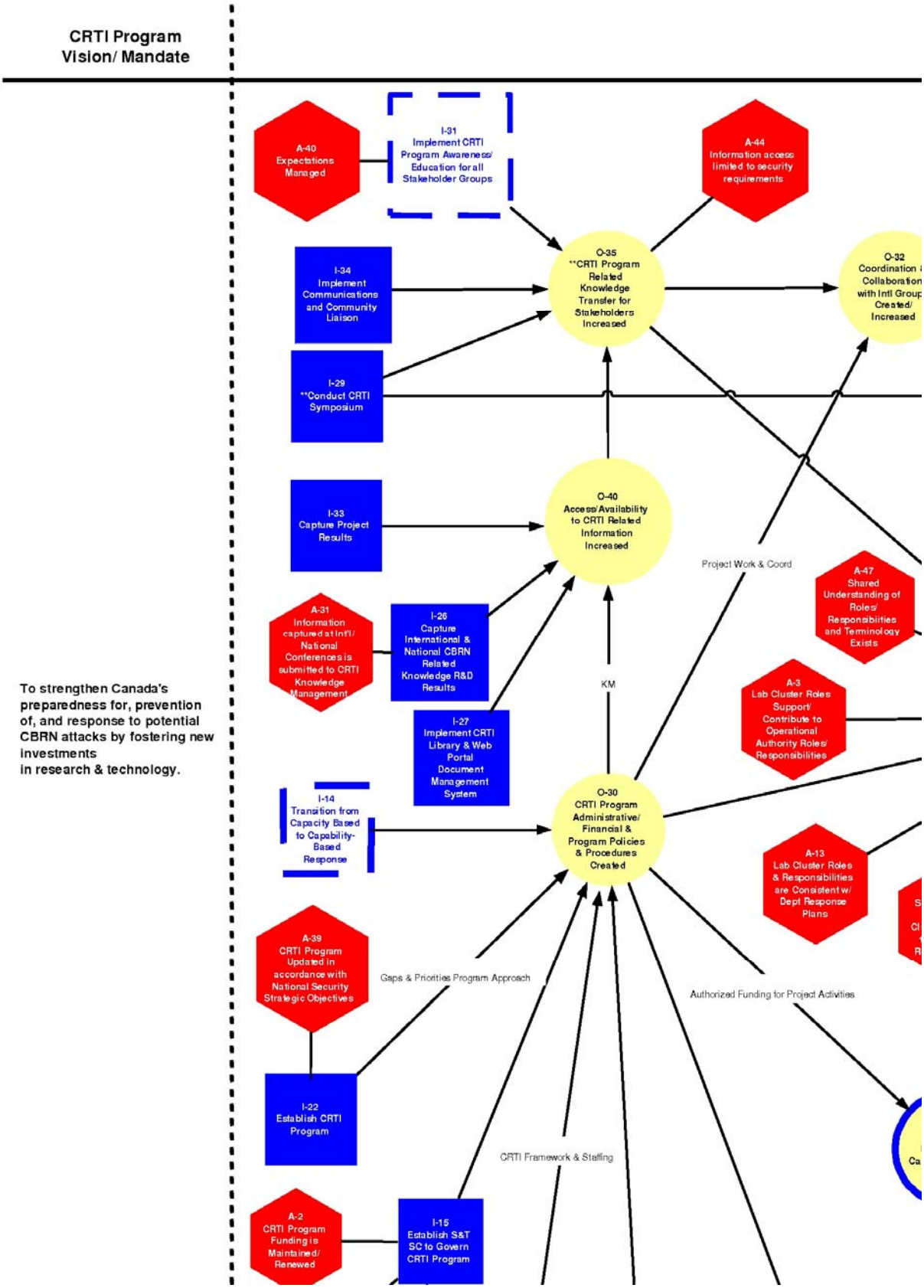
  This section of the model includes those initiatives, outcomes, assumptions (risks to achievement of anticipated benefits), linkages to other organizations and contributions that are considered to be ***necessary and sufficient*** for the achievement of anticipated interim and final outcomes. It is important to note that the workshop deliverable was an initial draft of the model which is considered to be a baseline version that should be refined going forward.

  The key components and elements of the CRTI Program depicted on the model include:

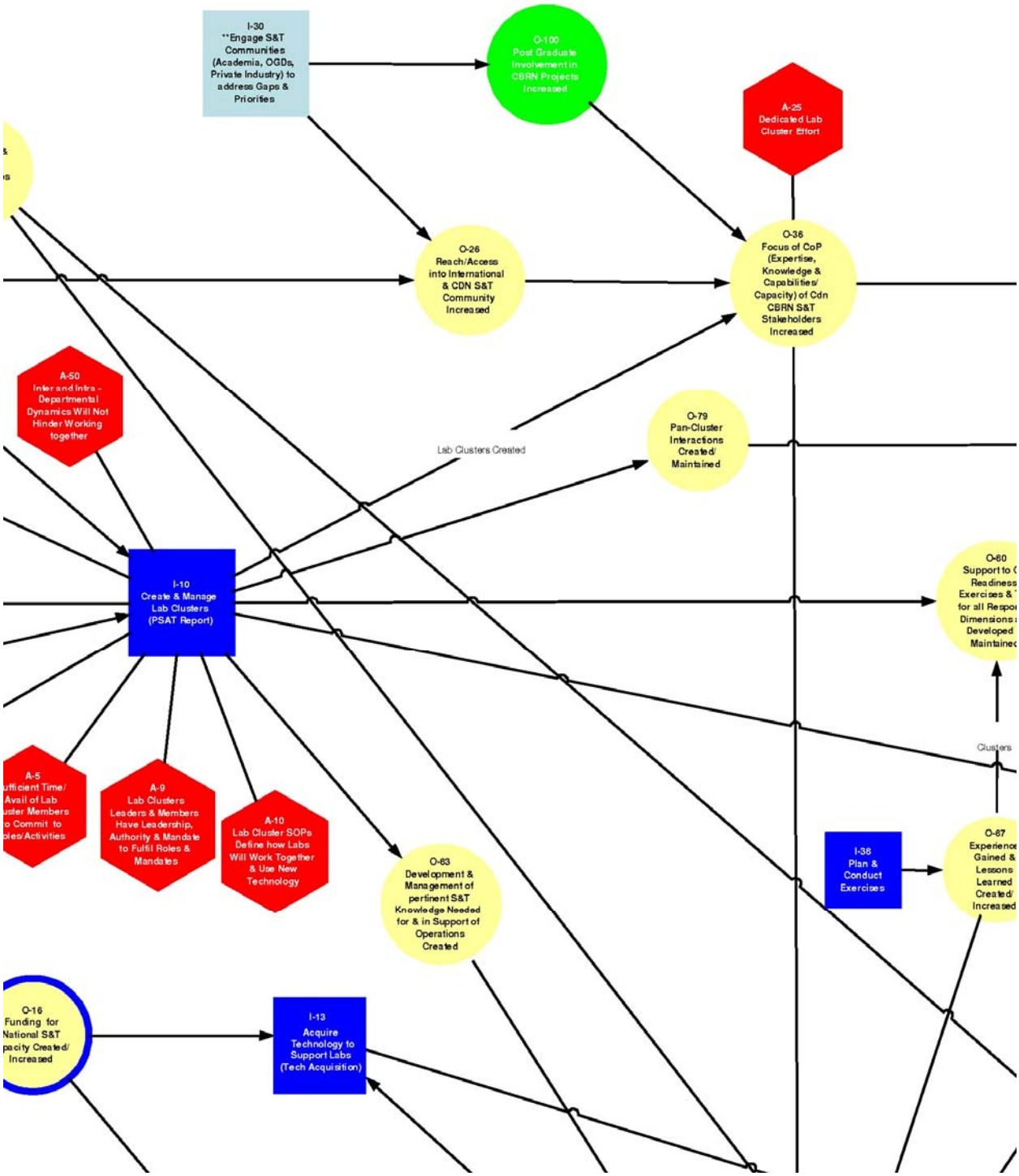
  - Establishment of the CRTI Program and the CRTI SC indicated at O-30;
  - Establishment of Lab Clusters starts at Initiative I-10, Provision of Project Oversight and R&D and Technology Acceleration Project Funding starts at Outcomes O-33 and O-16 and respective contributions to Outcome O-25, the provision of funds to build National S&T Capacity initiated by I-13 and contribution to Outcome O-28 and beyond, and CRTI Program and Knowledge Management starts at Outcome O-40;
  - Linkages to the National Response Plan, 1st Responder and operational community are depicted just to the left of the legend with the Initiatives outlined in green (I-40, I-20, I-16, I-18, I-21 and I-19) and corresponding Outcomes (O-89, O-68, O-66, O-67 and O-78);
  - Key interim outcomes (yellow circles with blue outline) are taken from the CRTI RMAF. They are considered to be the outcomes that should be measured and monitored as key indicators within an outcomes measurement and management framework going forward; and
  - Two negative outcomes are indicated (yellow circles with red outline)—O-70 and O-52.

ANNEX C

- ***CRTI Program Final Outcomes (white-filled outcomes with blue outline border)***—second column from the right depicts the final outcomes for the CRTI Program which were taken directly from the CRTI RMAF dated 24 September 2003.
- ***PSAT Strategic Objectives (white-filled outcomes with green outline border)***—Since 2002, the CRTI Program and RMAF were aligned to the PSAT strategic objectives that are depicted in the right hand column of the model. Time constraints during the Results Chain development workshop did not permit identification of contributions to these objectives and outcomes. These PSAT objectives have evolved to national security strategic objectives. Going forward, the CRTI Report proposes that CRTI should align with the evolving national security strategic objectives.


CRTI Program Vision/ Mandate
To strengthen Canada's preparedness for, prevention of, and response to potential CBRN attacks by fostering new investments in research & technology.
A-40 Expectations Managed
I-31 Implement CRTI Program Awareness/ Education for all Stakeholder Groups
A-44 Information access limited to security requirements
I-34 Implement Communications and Community Liaison
O-35 **CRTI Program Related Knowledge Transfer for Stakeholders Increased
O-32 Coordination Collaboration with Intl Group Created/ Increased
I-29 **Conduct CRTI Symposium
I-33 Capture Project Results
O-40 Access/Availability to CRTI Related Information Increased
Project Work & Coord
A-47 Shared Understanding of Roles/ Responsibilities and Terminology Exists
A-31 Information captured at Int'l/ National Conferences is submitted to CRTI Knowledge Management
I-26 Capture International & National CBRN Related Knowledge R&D Results
KM
A-3 Lab Cluster Roles Support/ Contribute to Operational Authority Roles/ Responsibilities
I-27 Implement CRTI Library & Web Portal Document Management System
I-14 Transition from Capacity Based to Capability-Based Response
O-30 CRTI Program Administrative/ Financial & Program Policies & Procedures Created
A-13 Lab Cluster Roles & Responsibilities are Consistent w/ Dept Response Plans
A-39 CRTI Program Updated in accordance with National Security Strategic Objectives
Gaps & Priorities Program Approach
Authorized Funding for Project Activities
I-22 Establish CRTI Program
CRTI Framework & Staffing
A-2 CRTI Program Funding is Maintained/ Renewed
I-15 Establish S&T SC to Govern CRTI Program

CRTI Program Results Chain Model
V013 of 16 Mar 06
CRTI Program S&T Capability/Capacity Interim Re



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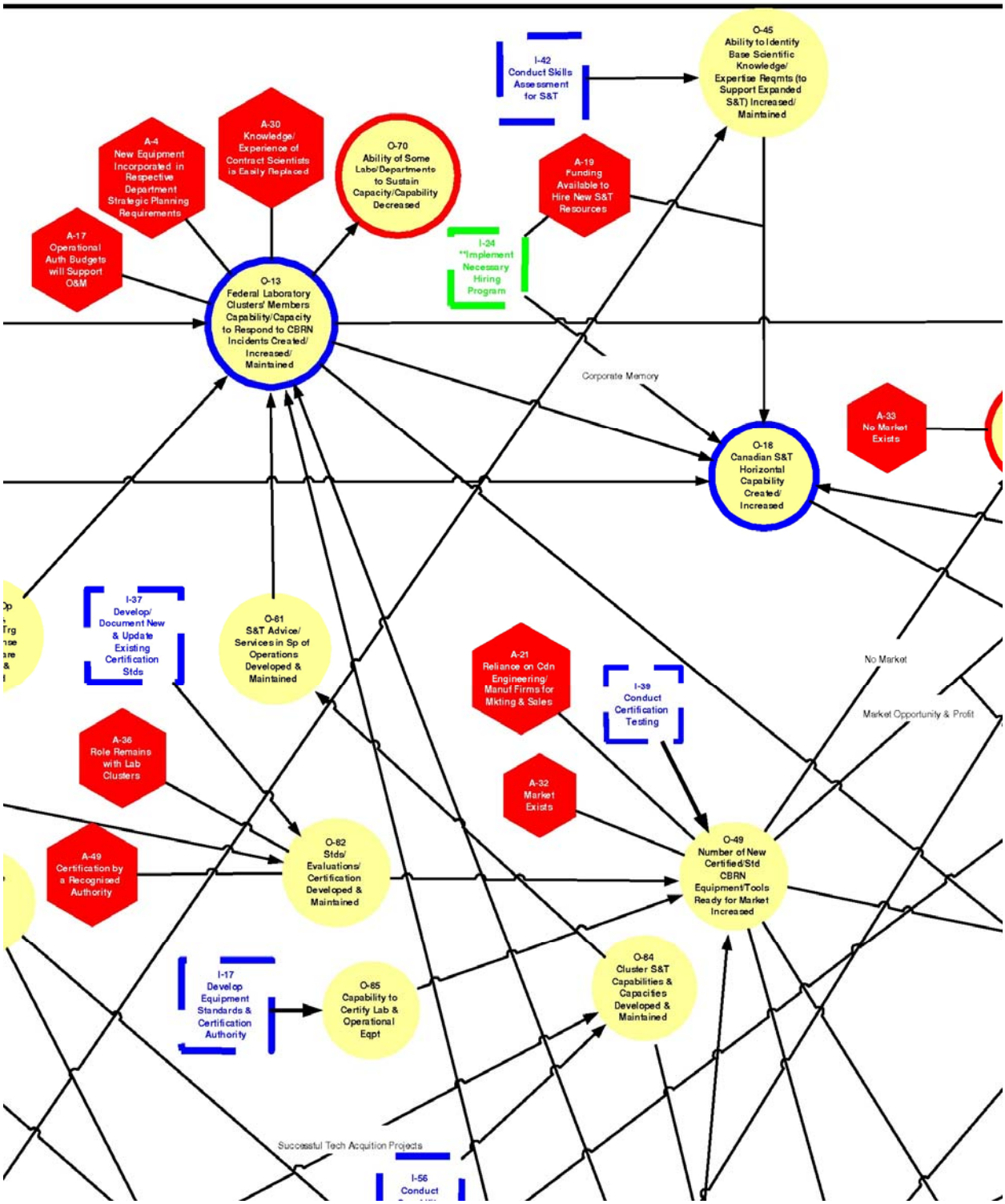
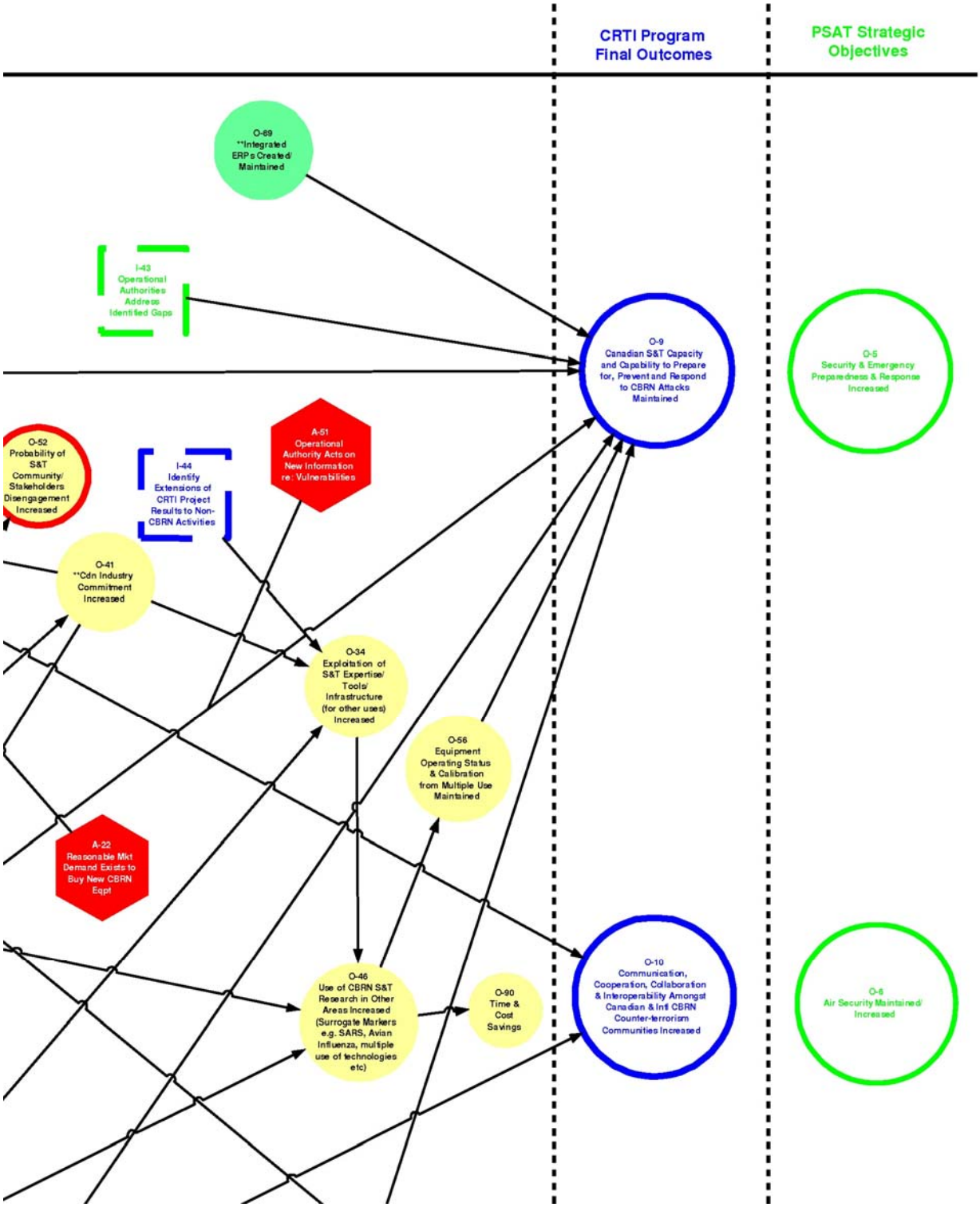
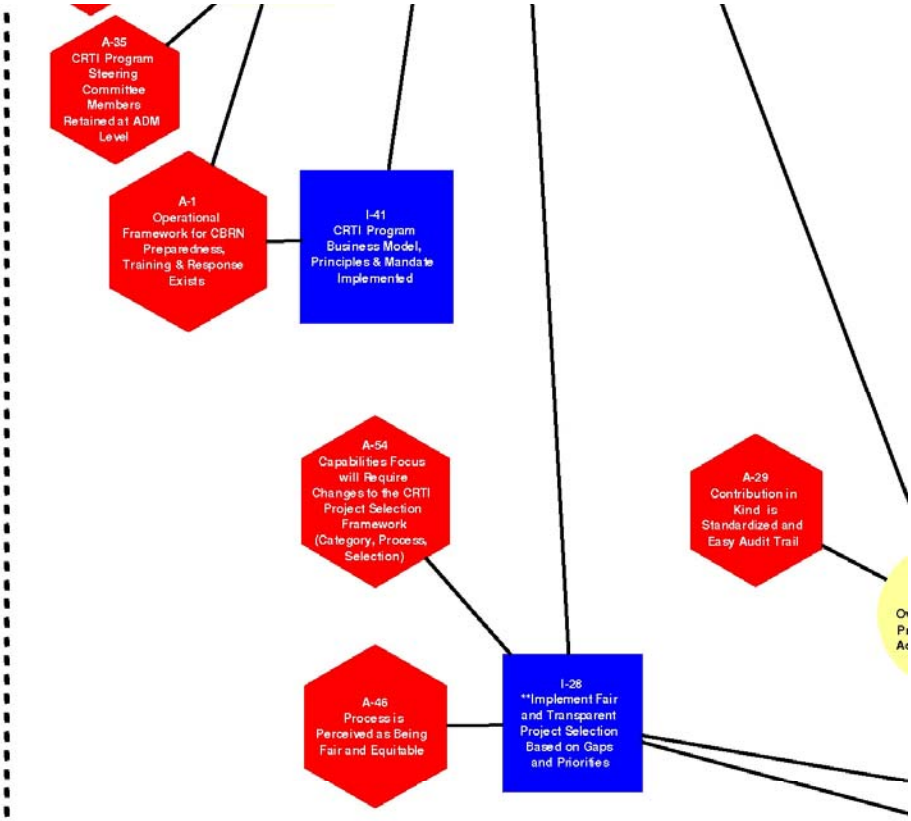
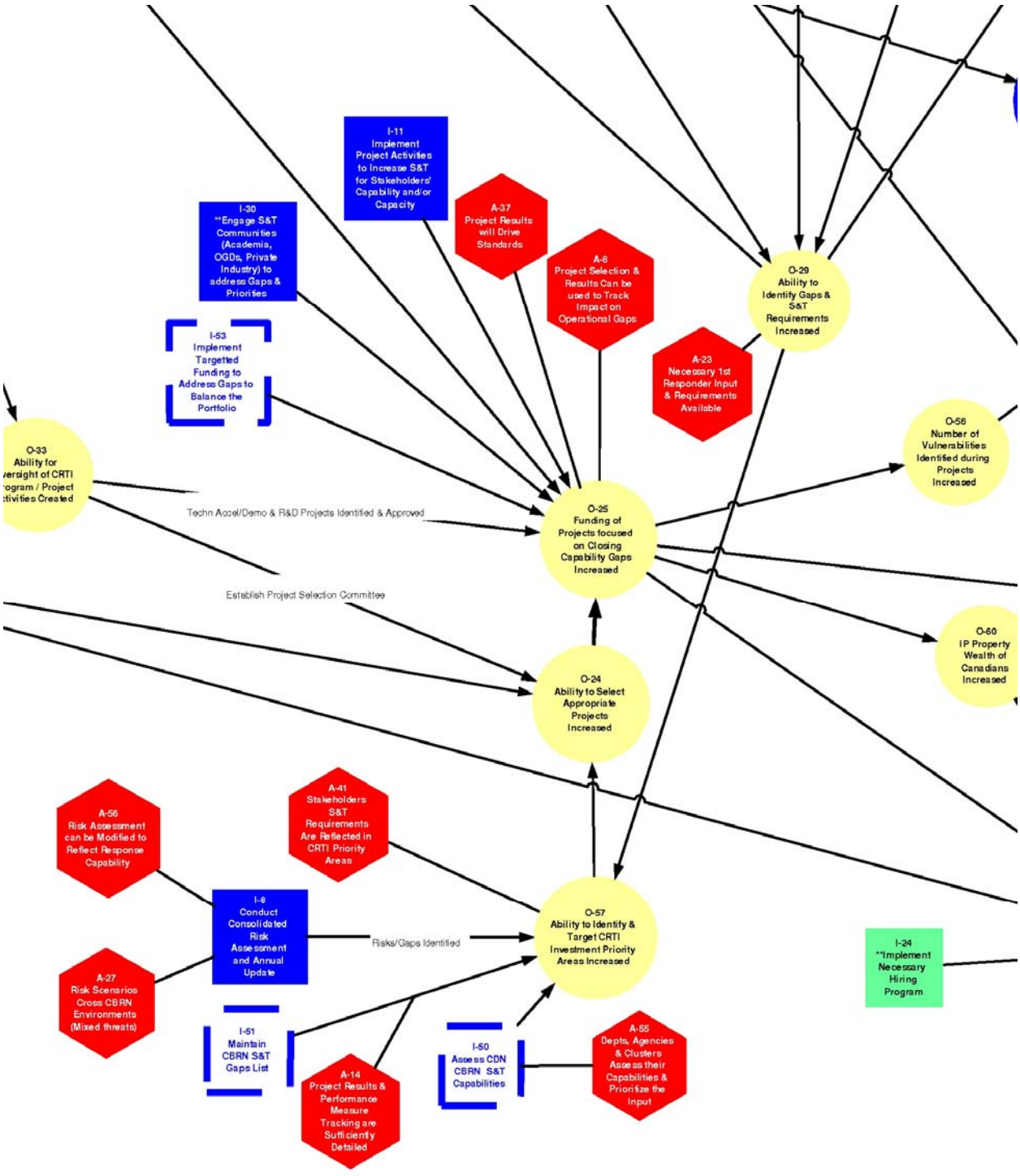
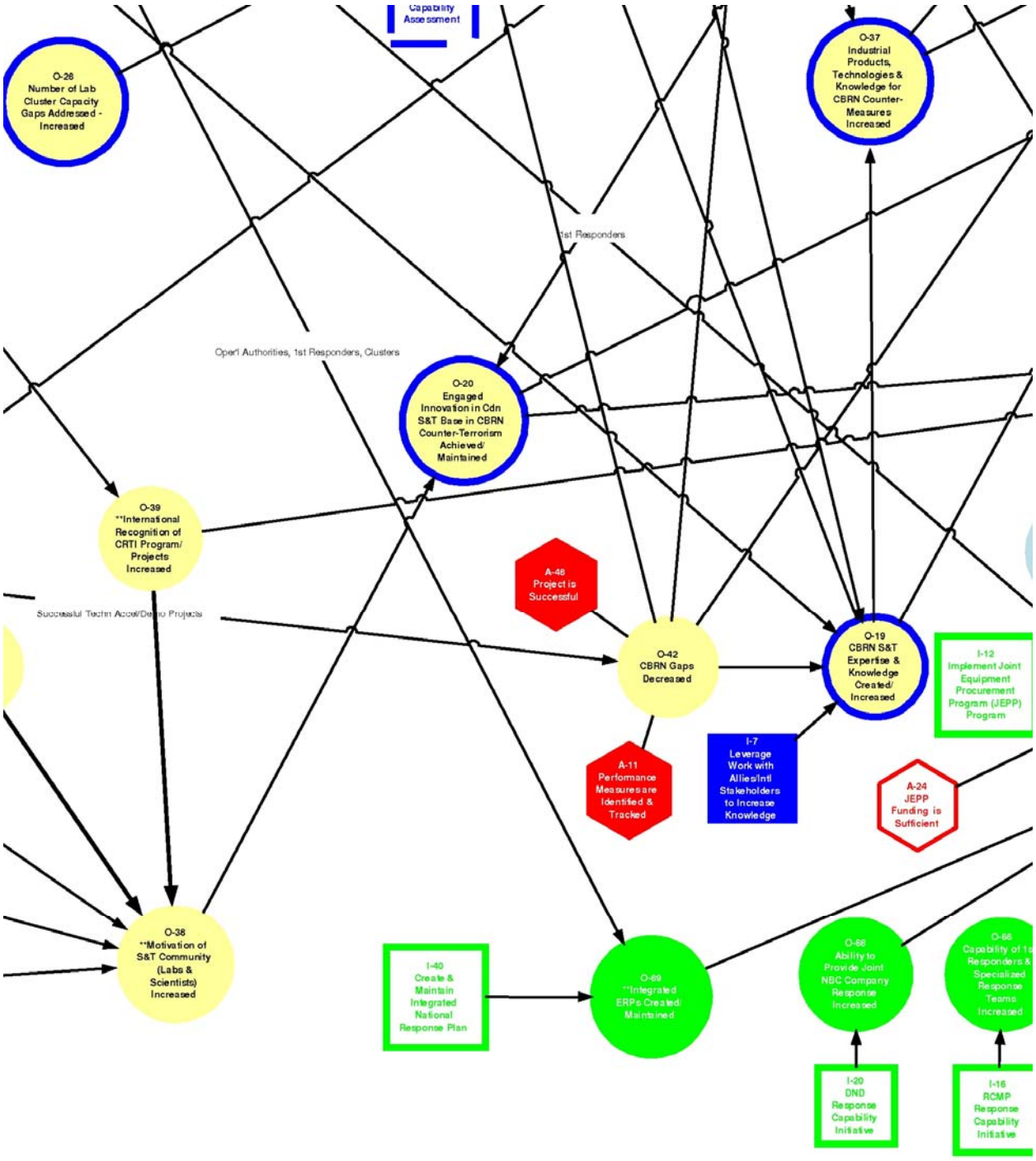
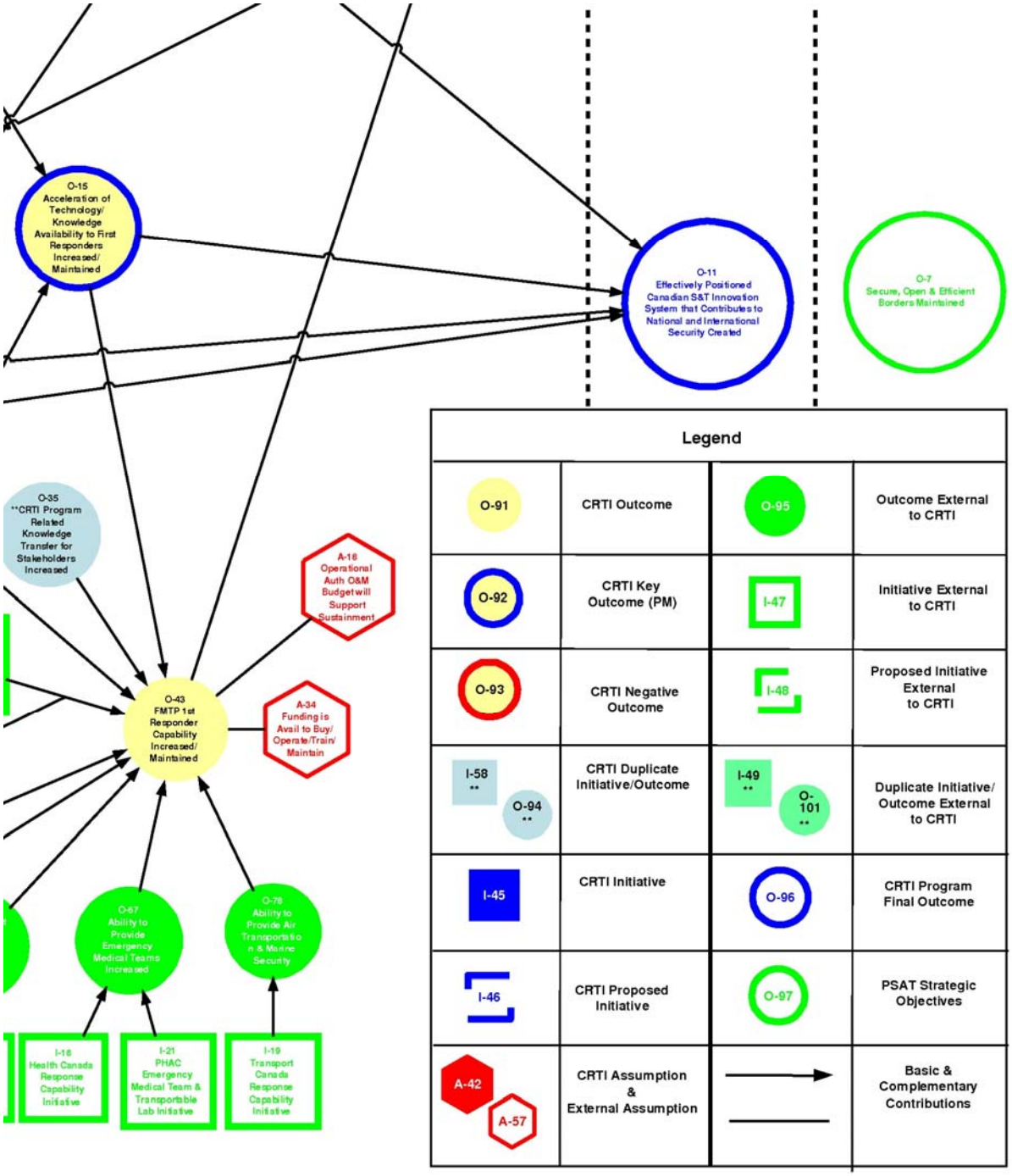

O-45
Ability to Identify Base Scientific Knowledge/ Expertise Reqmts (to Support Expanded S&T) Increased/ Maintained
I-42
Conduct Skills Assessment for S&T
A-30
Knowledge/ Experience of Contract Scientists is Easily Replaced
A-4
New Equipment Incorporated in Respective Department Strategic Planning Requirements
O-70
Ability of Some Labs/Departments to Sustain Capacity/Capability Decreased
A-19
Funding Available to Hire New S&T Resources
A-17
Operational Auth Budgets will Support O&M
I-34
**Implement Necessary Hiring Program
O-13
Federal Laboratory Clusters' Members Capability/Capacity to Respond to CBRN Incidents Created/ Increased/ Maintained
Corporate Memory
A-33
No Market Exists
O-18
Canadian S&T Horizontal Capability Created/ Increased
I-37
Develop/ Document New & Update Existing Certification Stds
O-61
S&T Advice/ Services in Sp of Operations Developed & Maintained
A-21
Reliance on Cdn Engineering/ Manuf Firms for Mkting & Sales
I-39
Conduct Certification Testing
No Market
Market Opportunity & Profit
A-36
Role Remains with Lab Clusters
A-32
Market Exists
A-49
Certification by a Recognised Authority
O-62
Stds/ Evaluations/ Certification Developed & Maintained
O-49
Number of New Certified/Std CBRN Equipment/Tools Ready for Market Increased
I-17
Develop Equipment Standards & Certification Authority
O-65
Capability to Certify Lab & Operational Eqpt
O-64
Cluster S&T Capabilities & Capacities Developed & Maintained
Successful Tech Acquition Projects
I-56
Conduct


CRTI Program
Final Outcomes
PSAT Strategic
Objectives
O-69
**Integrated
ERPs Created/
Maintained
I-43
Operational
Authorities
Address
Identified Gaps
O-9
Canadian S&T Capacity
and Capability to Prepare
for, Prevent and Respond
to CBRN Attacks
Maintained
O-5
Security & Emergency
Preparedness & Response
Increased
A-51
Operational
Authority Acts on
New Information
re: Vulnerabilities
O-52
Probability of
S&T
Community/
Stakeholders
Disengagement
Increased
I-44
Identify
Extensions of
CRTI Project
Results to Non-
CBRN Activities
O-41
**Cdn Industry
Commitment
Increased
O-34
Exploitation of
S&T Expertise/
Tools/
Infrastructure
(for other uses)
Increased
O-56
Equipment
Operating Status
& Calibration
from Multiple Use
Maintained
A-22
Reasonable Mkt
Demand Exists to
Buy New CBRN
Eqpt
O-10
Communication,
Cooperation, Collaboration
& Interoperability Amongst
Canadian & Intl CBRN
Counter-terrorism
Communities Increased
O-46
Use of CBRN S&T
Research in Other
Areas Increased
(Surrogate Markers
e.g. SARS, Avian
Influenza, multiple
use of technologies
etc)
O-90
Time &
Cost
Savings
O-6
Air Security Maintained/
Increased


A-35
CRTI Program Steering Committee Members Retained at ADM Level
A-1
Operational Framework for CBRN Preparedness, Training & Response Exists
I-41
CRTI Program Business Model, Principles & Mandate Implemented
A-54
Capabilities Focus will Require Changes to the CRTI Project Selection Framework (Category, Process, Selection)
A-29
Contribution in Kind is Standardized and Easy Audit Trail
A-46
Process is Perceived as Being Fair and Equitable
I-28
**Implement Fair and Transparent Project Selection Based on Gaps and Priorities


I-11
Implement Project Activities to Increase S&T for Stakeholders' Capability and/or Capacity
A-37
Project Results will Drive Standards
I-30
**Engage S&T Communities (Academia, OGDs, Private Industry) to address Gaps & Priorities
A-8
Project Selection & Results Can be used to Track Impact on Operational Gaps
O-29
Ability to Identify Gaps & S&T Requirements Increased
I-53
Implement Targetted Funding to Address Gaps to Balance the Portfolio
A-23
Necessary 1st Responder Input & Requirements Available
O-58
Number of Vulnerabilities Identified during Projects Increased
O-33
Ability for ersight of CRTI ogram / Project ctivities Created
Techn Accel/Demo & R&D Projects Identified & Approved
O-25
Funding of Projects focused on Closing Capability Gaps Increased
Establish Project Selection Committee
O-60
IP Property Wealth of Canadians Increased
O-24
Ability to Select Appropriate Projects Increased
A-56
Risk Assessment can be Modified to Reflect Response Capability
A-41
Stakeholders S&T Requirements Are Reflected in CRTI Priority Areas
I-8
Conduct Consolidated Risk Assessment and Annual Update
Risks/Gaps Identified
O-57
Ability to Identify & Target CRTI Investment Priority Areas Increased
I-24
**Implement Necessary Hiring Program
A-27
Risk Scenarios Cross CBRN Environments (Mixed threats)
I-51
Maintain CBRN S&T Gaps List
A-14
Project Results & Performance Measure Tracking are Sufficiently Detailed
I-50
Assess CDN CBRN S&T Capabilities
A-55
Depts, Agencies & Clusters Assess their Capabilities & Prioritize the Input


Capability Assessment
O-26 Number of Lab Cluster Capacity Gaps Addressed - Increased
O-37 Industrial Products, Technologies & Knowledge for CBRN Counter-Measures Increased
1st Responders
Oper'l Authorities, 1st Responders, Clusters
O-20 Engaged Innovation in Cdn S&T Base in CBRN Counter-Terrorism Achieved/ Maintained
O-39 **International Recognition of CRTI Program/ Projects Increased
A-46 Project is Successful
O-42 CBRN Gaps Decreased
O-19 CBRN S&T Expertise & Knowledge Created/ Increased
I-12 Implement Joint Equipment Procurement Program (JEPP) Program
A-11 Performance Measures are Identified & Tracked
I-7 Leverage Work with Allies/Intl Stakeholders to Increase Knowledge
A-24 JEPP Funding is Sufficient
O-38 **Motivation of S&T Community (Labs & Scientists) Increased
I-40 Create & Maintain Integrated National Response Plan
O-69 **Integrated ERPs Created/ Maintained
O-68 Ability to Provide Joint NBC Company Response Increased
O-66 Capability of 1st Responders & Specialized Response Teams Increased
I-20 DND Response Capability Initiative
I-16 RCMP Response Capability Initiative


O-15
Acceleration of Technology/ Knowledge Availability to First Responders Increased/ Maintained
O-11
Effectively Positioned Canadian S&T Innovation System that Contributes to National and International Security Created
O-7
Secure, Open & Efficient Borders Maintained
O-35
**CRTI Program Related Knowledge Transfer for Stakeholders Increased
A-16
Operational Auth O&M Budget will Support Sustainment
O-43
FMTP 1st Responder Capability Increased/ Maintained
A-34
Funding is Avail to Buy/ Operate/Train/ Maintain
O-67
Ability to Provide Emergency Medical Teams Increased
O-78
Ability to Provide Air Transportatio n & Marine Security
I-16
Health Canada Response Capability Initiative
I-21
PHAC Emergency Medical Team & Transportable Lab Initiative
I-19
Transport Canada Response Capability Initiative
Legend
O-91
CRTI Outcome
O-95
Outcome External to CRTI
O-92
CRTI Key Outcome (PM)
I-47
Initiative External to CRTI
O-93
CRTI Negative Outcome
I-48
Proposed Initiative External to CRTI
I-58 **
O-94 **
CRTI Duplicate Initiative/Outcome
I-49 **
O-101 **
Duplicate Initiative/ Outcome External to CRTI
I-45
CRTI Initiative
O-96
CRTI Program Final Outcome
I-46
CRTI Proposed Initiative
O-97
PSAT Strategic Objectives
A-42
A-57
CRTI Assumption & External Assumption
Basic & Complementary Contributions

ANNEX D—CRTI PROGRAM EVALUATION – DOCUMENTS REVIEWED

Document Name	Date of Issue
CRTI-B-2005-01 to CRTI-B-2005-10 Bulletins (Inclusive)	April–June 2005
CRTI-M-2003-001 Guidelines for CRTI Documents	December 2003
CRTI-M-2004-001 Project Review Committee (PRC): Guidelines for Annual Progress Review of CRTI Projects	November 2004
CRTI-M-2004-002 CRTI Guidebook: From Call for Proposal to Contract Award	May 2004
CRTI-M-2004-003 CRTI Call for Proposals: Guidebook for Fiscal Year 2004–2005	June 2004
CRTI-M-2004-004 CRTI Call for Proposals: Guidebook for Fiscal Year 2005–2006	November 2004
CRTI-M-2005-001 CRTI Call for Proposals: Guidebook for Fiscal Year 2005–2006	June 2005
CRTI-R-2002-003 Emergency Response Plan Workshop	December 2003
CRTI-R-2003-001 Lessons Learned and Best Practices from the CRTI Interim Project Team	January 2004
CRTI-R-2003-002 GIS Community of Experts Workshop	January 2005
CRTI-R-2003-003 CRTI Project Implementation Guidebook	December 2003
CRTI-R-2003-003 Protecting 1st Responders against CBRN Threats	February 2004
CRTI-R-2003-004 Machiavellian Opportunism	September 2005
CRTI-R-2004-001 Exercise As Is	April 2004
CRTI-R-2004-002 Literature Review of CBRN Performance Standards for Personnel Protection, Detection and Identification and Decontamination Equipment	October 2004
CRTI-R-2004-003 1st Responder Workshop and Technology Demonstration Day	January 2005
CRTI-R-2005-002 CRTI Renewal Workshop: A report of the Workshop held on 24 March 2005	July 2005
CRTI-R-2005-003 Exercise Follow On	July 2005
Science for a Secure Canada: Building Communities Annual Report 2002–2003 Parts I and II	
Science for a Secure Canada: Building Capacity Annual Report 2003–2004 Parts I and II	
CRTI Annual Report 2004-2005 Part I: Delivering Capabilities and Part II: The CRTI Portfolio 2004–2005	
CRTI Technology Acquisition Projects: Strengthening Operational Capacity 2002–2005	

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Document Name	Date of Issue
CBRN Risk Assessment: A Knowledge-based Approach to Emergency Response Planning and S&T Investments	
Report of the Auditor General of Canada, Chapter 2 National Security in Canada	April 2005
Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) Framework	May 2002
Results-based Management and Accountability Framework (RMAF) for the Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI)	24 September 2003
Memorandum of Understanding between the Department of National Defence & Participants concerning the Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) Amendment (3780-15 (DCRTI))	September 2003
Lab Cluster Implementation/Business Plan as of June 28, 2002, for the Chemical Lab Cluster	28 June 2002
DRAFT Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) Chemical Cluster Two-Year Plan	28 September 2004
Chemical Cluster Renewal Workshop: "As was said" Session Report	08 February 2006
CRTI—Chemical Cluster CBRN Emergency Technical Advisory Plan Draft Version 7	16 December 2003
R/N Cluster Renewal Focus 2010 Workshop: "As was said" Session Report	20 September 2005
CRTI Lab Cluster Implementation/Business Plan for the Forensic Cluster	
DRAFT Lab Cluster Implementation/Business Plan for the Biological Lab Cluster v21.0	24 May 2002
Public Security and Anti-Terrorism (PSAT) Reporting Template 2004/05 Annex A	
Public Security and Anti-Terrorism (PSAT) Report (DRAFT)	29 July 2003
Public Security and Anti-Terrorism (PSAT): Chemical, Biological, Radiological, Nuclear (CBRN) Research and Technology Initiative (CRTI) Evaluation Plan	
Steering Committee Minutes	Various
Symposium Proceedings	20 – 22 June 2005 15 – 16 June 2004 23 – 25 June 203
CRTI Financial Management Audit	September 2004
DND CRS, CRTI Program Evaluation Plan v1.0	20 January 2006

ANNEX E—CRTI PROGRAM EVALUATION LIST OF INTERVIEWEES

Interviewees for scheduled individual* and group interview sessions.

Dr. Harvey Artsob – Project Champion (PHAC)	*Dr. Ann Fraser – Cluster Leader & Project Champion (CFIA)	Dr. William Lee – PM (DRDC)
*Jean Patrice Auclair – Chief Nuclear Emergency Preparedness & Response-PM (HC)	R. Elaine Fulton – PM (DRDC)	Gary A. Lombaert – PM (HC)
Stan Bacler – PM (CFIA)	*Dr. Kent Harding – Project Champion (DRDC)	Ms. Julie Tremblay-Lutter – PM (DRDC)
*Dr. Cam Boulet – Director, CRTI (DRDC)	Dr. Dean Haslip – PM (DRDC)	Kym Martin – Project Champion (PHAC)
Dr. Laura Brown – PM (NRC)	Dr. Sadiq Hasnain – PM (NRC)	Susan McIntyre – CRTI Secretariat
Insp. John Bureaux – PM (RCMP)	Ron Hrynchuk – PM (RCMP)	Dr. Michael Mulvey – PM (PHAC)
*Mr. Pierre Caron PSEPC – PM (HC)	……	*Denis Nelson – Cluster Leader (RCMP)
*Dr. Jack Cornett – Cluster Leader & Project Champion (HC)	Michel Jean – Director, National Predictions Operations	Mr. Patrick Parent – PM (HC)
Dr. Tom Cousins – PM (DRDC)	Dr. Steve Jones – PM (PHAC)	*James Peek – Acting Chief, Emergency & Bioterrorism Response Div – PM (PHAC)
Dr. Phil Davis – PM (AECL-Chalk R)	*Dr. Amin Kabani – Project Champion & Project Manager (PHAC)	*Dr. Frank Plummer – Cluster Leader (PHAC)
Sheldon Dickie– CRTI Secretariat	Dr. Liam Kieser – PM (HC)	Mr. Eric Stephen – Project Manager (DRDC)
Dr. Eva Dickson – PM (RMC)	Mr. Paul Kitching – Project Champion/ Project Manager (CFIA)	Ted Sykes – CRTI Secretariat
Dr. Marie D'lorio – Project Champion (NRC)	Mr. Bill Kournikakis – Chemical & Biological Defence Section – PM (DRDC)	Dr. Caroline Vachon – PM (NRC)
Dr. Michel Dumoulin – Project Champion (NRC)	William S. Lanterman – PM (CFIA)	*Dr. Malcom Vant – Project Champion (DRDC)
Dr. Lorne Erhardt – PM (DRDC)	*Dr. Jack Lavigne – Project Champion (DRDC)	
Dr. Heinz Feldmann –Project Champion & Project Manager (PHAC)	Ms. Denise Leblanc – Project Champion (NRC)	

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ANNEX E

Interviews requested, but not conducted.

*Ms. Deanna St. Prix Alexander – Project Champion (HC) – ***Not conducted***	Dave Dockendorff – PM (EC)	Robert Shives – PM (NRC)
Dr. Jeff Aramini – PM (HC)	Connie Doan – PM (CFIA)	Dr. Don Stewart – PM (HC)
Dr. John Austin – PM (HC)	*Denis Guitor – PM (CFIA)	*R. Kurt Ungar – Project Manager Head, Verification & Incident Monitoring- Radiation Protection Bureau (HC) – ***Not conducted***
Dr. Michel Beland – Project Champion (EC)	Mr. Derick Ivany – PM (RCMP)	Dave Warry – PM (EC)
Mr. Steve Clarkson – Project Champion (HC)	Dr. Les Nagata – PM (DRDC)	

ANNEX F—CRTI RESULTS CHAIN AND STEERING COMMITTEE WORKSHOPS ATTENDEES

CRTI Results Chain Workshop Attendees	
Invited	***Attended***
Richard Hogue	**Y**
Tim Patraboy	**Y**
Eric R. Pellerin	
Amin Kabani	
Shane Renwick	
Laura Brown	**Y**
Peter Armstrong	
Helen Spencer	**Y**
Norman Yanofsky	**Y**
Rocky Dwyer	
Susan McIntyre	

CRTI Steering Committee Workshop Attendees
Robert Walker, CEO/DRDC and ADM(S&T)/DND, Chair
…….
Judith Bossé, CFIA
Ann Fraser, CFIA
Ken Holmes, NRCan
Nick Cartwright, Transport
Michael Ball, Transport
Gilles Saindon, A/Director General, Science Bureau
Steve Lamirande, AAFC
Diane Keller, CBSA
Gabrielle Adams, NRC
Darlene Smith, DFO
Michael Jeffrey, RCMP
Richard Saucier, PSEPC
Alain Tremblay, PCO
Anthony Ashley, DG/DRDC CSS
Cam Boulet, Director CRTI
Susan McIntyre, CRTI Secretariat
Peter Armstrong, TBS
Rocky Dwyer, CRS

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ANNEX G—CRTI GLOSSARY

ADM	Assistant Deputy Minister
AECL	Atomic Energy of Canada Ltd.
BSE	Bovine Spongiform Encephalopathy (Mad Cow Disease)
CBP	Capability-based planning
CBRN	Chemical, Biological, Radiological and Nuclear
CFIA	Canadian Food Inspection Agency
CRS	Chief Review Services
CRTI	Chemical, Biological, Radiological and Nuclear (CBRN) Research and Technology Initiative
CSIS	Canadian Security Intelligence Service
CSS	Centre for Security Science
DND	Department of National Defence
DRDC	Defence Research and Development Canada
EC	Environment Canada
FY	Fiscal year
HC	Health Canada
IP	Intellectual Property
MOU	Memorandum of Understanding
NCR	National Capital Region
OAG	Office of the Auditor General
P/T/M	Provincial/Territorial/Municipal
PHAC	Public Health Agency of Canada
PRC	Project Review Committee
PSAT	Public Security Anti-Terrorism
PSEPC	Public Safety and Emergency Preparedness Canada
PSTP	Public Security Technical Program
PY	Person years
R&D	Research and development
RCMP	Royal Canadian Mounted Police
RMAF	Results-based Management and Accountability Framework
RMC	Royal Military College
S&T	Science and technology
SARS	Severe Acute Respiratory Syndrome
SC	CRTI Steering Committee
TBS	Treasury Board Secretariat