As an accelerator laboratory, the heart of TRIUMF is its main cyclotron. The main cyclotron runs 24 hours a day, 7 days a week for about 9 months of the year. When it is running, everything is moving forward: from discovery to innovation, from research to commercialization. When CYC is ON, the game is on!

With the launch of the ARIEL project, TRIUMF will soon have a second heartbeat—the new electron linear accelerator. Stay tuned for updates as ARIEL Phase I approaches completion in 2014-2015.
TRIUMF IS ONE OF
THE WORLD’S LEADING
SUBATOMIC PHYSICS
LABORATORIES

TRIUMF brings together dedicated researchers and interdisciplinary talent, sophisticated technical resources, and commercial partners in a way that has established the laboratory as a global model of success.
MESSAGE FROM THE CHAIR OF THE BOARD

When I think of TRIUMF, two qualities come to mind immediately: progress and impact.

On July 21, the space shuttle Endeavour made its last landing, concluding a series of missions that have contributed to revitalizing the importance of space travel and astronomy research. At TRIUMF, researchers have compared space-based observations of distant stars to observations in the laboratory and have started to recreate the chain of physics that gives rise to the chemical elements of our planet and our bodies. That is progress.

Over the past four years, there have been three times when the world has experienced seriously low availability of medical isotopes—radioactive particles that have become critical in cancer treatment and in making medical imaging more effective. When these shortages occurred, TRIUMF adapted its research and developed new ways to address the problem. That is impact.

Both of these examples prove that the world needs TRIUMF. The TRIUMF laboratory is owned and operated as a joint venture by a consortium of universities. This relationship positions TRIUMF as a national resource in close proximity with the faculty, students, and innovators on 17 different Canadian university campuses. The result is a powerful research network that exploits the knowledge, skills, and abilities uniquely available at TRIUMF to elevate Canada’s performance to new levels of progress and impact.

The mission of TRIUMF is therefore multidimensional—and essential—for Canada: combining disciplines, bridging the academic and private sectors, and empowering Canadians to effectively contribute to and compete on the global stage.

I am pleased to report that TRIUMF is in excellent financial health. With annual expenditures exceeding $70 million, TRIUMF has expanded its program and its supporting partners, notably including Western Economic Diversification Canada, Natural Resources Canada, and the Government of British Columbia.

Over the coming years, TRIUMF will enhance its role at the forefront of basic research through our involvement with leading laboratories overseas as well as globally relevant research here on home soil. And TRIUMF will expand its ability to produce science that is of practical value to Canadians—and global society—through its associated Centre of Excellence for Commercialization and Research.

I believe global society is on the cusp of achieving great things. I also believe TRIUMF is well prepared to be part of them. I look forward to working with you as we build that future.

Sincerely,

R. Paul Young | Chair, TRIUMF Board of Management | Vice-President, Research, University of Toronto

[1] To make discoveries that address the most compelling questions in particle physics, nuclear physics, nuclear medicine, and materials science; [2] To act as Canada’s steward for the advancement of particle accelerators and detection technologies; and [3] To transfer knowledge, train highly skilled personnel, and commercialize research for the economic, social, environmental, and health benefit of all Canadians.
TRIUMF has now completed the first year of its Five-Year Plan: Building a Vision for the Future. So, how did the first year turn out? Productive and successful!

Inside of its mission, TRIUMF seeks to advance knowledge and technology. All of our science and technology begins with a connection to accelerators. The science program is steered by top university researchers from all across Canada and by our international user community. In this report, you will learn about TRIUMF’s support of Canada’s strength in multiple areas of science and technology, from particle physics and neutrinos to materials science and PET imaging used in medical research.

Although our international reputation as an accelerator laboratory with leading-edge technology has been established for some time now, the vision for TRIUMF asks for more as we strive to blend science, technology, and societal impact. Indeed, a very modern laboratory must not only excel in science, it must also have relevance as a driver of technology—and a driver of economic and social impact.

The past year has showcased TRIUMF’s efforts on this front with our focus on advancing isotopes for science and for medicine. Over a decade ago TRIUMF contributed to the design and engineering of small accelerators to produce medical isotopes for clinical use. A broad array of various types of these medical cyclotrons manufactured by Advanced Cyclotron Systems, Inc. are now in operation all around the world producing medical isotopes for research and clinical use. Thanks to top university researchers across Canada, our international user community, and our industrial partners, this Canadian business continued to boom in 2010.

I would be remiss if I did not acknowledge the tremendous courage and commitment of our colleagues in Japan who endured earthquakes, tsunamis, and nuclear-reactor crises in March 2011. As a close collaborating partner in several key Japanese research efforts, we stand committed with the world that these setbacks be overcome and that we all continue to succeed as a global community.

As we enter year two of our plan, we will continue to share the technology we develop, to use it to create and study exotic nuclei and materials, to address far-reaching questions concerning the nature of matter, and to advance nuclear-medicine research. By doing so, we will remain fully integrated into a fast-paced, discovery-driven, global science agenda.

Our vision is on track. Game on!

Sincerely,

Nigel S. Lockyer | Director, TRIUMF

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**Lead in Science:** The world sees TRIUMF as Canada’s leader in probing the structure and origins of matter and in advancing isotopes for science and medicine.

**Leverage University Research:** The Canadian university research community views TRIUMF as a way to strengthen and expand their research programs.

**Connect Canada to the World:** International subatomic physics laboratories look to TRIUMF when partnering with Canada and its research community.

**Create Social and Economic Growth:** The global scientific community sees TRIUMF as a bridge between academia and the private sector and as a model for commercialization and social impact.
A good business focuses on a few core competencies while remaining poised and flexible to adopt new practices or product lines. As a publicly funded national research laboratory, TRIUMF is quite similar.

Our research program is driven by two core themes: [1] Probing the structure and origin of matter, and [2] Advancing isotopes for science and medicine. These thrusts build on core strengths in accelerator-based science and the development and exploitation of modern detector systems for experiments in subatomic physics. TRIUMF strives for excellence in these areas while keeping its eye on important and new opportunities.

Understanding the origin of the chemical elements, which make up our bodies and the world around us, is a major thrust for the TRIUMF program. It is still not fully understood how the elements are produced in the various stages of stellar burning and explosion. Often rare isotopes that are intermittently produced are involved in these processes, and the study of the properties of these nuclei and their contribution to the astrophysical reactions promises to reveal how nuclear physics governed the origins of the atoms and molecules in our world. Another direction in nuclear physics aims at developing a unified theoretical framework with predictive power for the description of nuclear and nuclear matter based on fundamental forces. With some of the highest production rates in the world at ISAC (and ARIEL in the future) and in combination with its world-class experimental facilities, TRIUMF is poised to take a leading position in this fundamental investigation.

The activities at TRIUMF predominantly make use of the main cyclotron for the production of secondary beams of pions, muons, and short-lived isotopes (called rare isotopes, radioisotopes, or even radioactive ions), which are used for basic research as well as nuclear medicine. TRIUMF also has unique tools at hand to characterize chemical reactions, molecular binding, and new materials in particular with respect to their magnetic properties.
The Centre for Molecular and Materials Science at TRIUMF serves a wide international science and technology community with several stations for measurements using µSR and β-NMR experiments. The research topics are relevant to a broad spectrum of applications in other areas of science and industry including high temperature superconductivity, quantum computing, spintronics, chemical reactions relevant for next generation reactors, and next-generation batteries.

In addition to subatomic physics, TRIUMF also specializes in nuclear medicine through the research and development of medical isotopes to advance the diagnosis and treatment of disease. The basic research program made possible by TRIUMF is tightly coupled with efforts to create social and economic growth through invention, innovation, and commercialization with a network of partners. As a stand-alone division at TRIUMF, the nuclear-medicine team is rapidly establishing itself as a national centre of excellence for isotope production, separation, and radiochemistry technologies. The group works closely with the Pacific Parkinson’s Research Centre and the BC Cancer Agency.

Another major thrust in TRIUMF’s scientific program aims at identifying and understanding the nature and origin of the elementary particles—the fundamental building blocks of our world—and the forces between them. Substantial evidence now indicates that the current Standard Model of Particle Physics may be incomplete, that new particles may exist, and that our comprehension of the fundamental forces may be limited. TRIUMF is ideally positioned to make major contributions in this quest to understand these forces through the portfolio of local and external experiments being carried out by TRIUMF scientists.

One example is the Large Hadron Collider (LHC) at CERN which is expected to produce the elusive Higgs particle as well as new particles not predicted by the Standard Model. It is possible that one of these unknown particles actually comprises the stuff of dark matter for which we have astronomical evidence based on large-scale gravitational observations. With its participation in the ATLAS experiment at the LHC and with the Tier-1 Data Centre at TRIUMF, the Canadian particle-physics community is making substantial contributions to this global pursuit. At the same time the DEAP experiment in SNOLAB (with help from TRIUMF) will be searching for primordial dark matter particles traversing the earth.

High-precision measurements are an ideal tool to search for deviations from Standard Model predictions and for the discovery of effects forbidden in the Standard Model. TRIUMF is carrying out or is involved in a number of experiments that fall into this category. The T2K experiment in Japan aims at establishing one of the last remaining properties of neutrinos responsible for neutrino oscillations and their potential contributions to the evolution of the universe. The SNO+ experiment currently under construction at SNOLAB will also study neutrinos. The ALPHA experiment at CERN has recently produced and stored antihydrogen for more than 15 minutes, an essential step towards precision spectroscopy of the properties of antihydrogen to test if antimatter and matter really do behave the same. Other experiments in this category are the PiENu experiment at TRIUMF as well as several experiments at ISAC which are using rare isotopes as a laboratory for precision measurements.

Perhaps the most exciting element of TRIUMF’s science program is the recently launched ARIEL project. This new facility will focus on the production and development of isotopes for science and medicine and will give Canada a globally competitive advantage in research and innovation. It is an exciting moment to be at TRIUMF—and to be involved in Canadian research.

STELLAR ALCHEMY
Where did gold come from? The answer lies within the stars. When the universe was a few minutes old, all the remaining neutrons in the universe had paired up with protons to form light nuclei like those at the centers of helium and lithium atoms today; the remaining protons formed hydrogen atoms. All the other elements, including those of which life is comprised, were produced by nuclear-physics processes occurring within stars and in stellar explosions. Those nuclear processes involve thousands of unique nuclei, both the stable ones that we ordinarily see as well as unstable nuclei that we see fleetingly in stellar reactions or radioactive decay. Many of these short-lived “rare-isotope” nuclei also play crucial roles in reactions taking place within the cores of nuclear reactors. TRIUMF’s rare-isotope beam research aims to achieve a masterful understanding of this “alchemy” that produced—and continues to fuel—the present-day universe.

ADDRESS THE MOST COMPELLING SCIENCE QUESTIONS...

One highlight for the year, in December 2010, was the successful production of rare isotopes from an actinide target with intensities comparable to the biggest overseas competitors (CERN’s ISOLDE facility).

This technology is new to TRIUMF, and it allowed researchers to produce and study new heavy isotopes. In one result, TRIUMF scientist Jens Lassen probed the structure of an exotic isotope of Astatine using an ionization scheme 50 times more efficient than CERN’s. He found sets of energy levels, never before witnessed, which revealed a more sophisticated nuclear structure than anticipated. Also, for the first time, TRIUMF could investigate the properties of nuclei at the edge of the astrophysical r-process responsible for the creation of half of the heavy elements beyond iron in the universe. The full series of original scientific results are being announced in summer 2011 and will place Canada at the forefronts of the global nuclear-physics research effort.

With its ISAC facility, TRIUMF provided exotic rare isotopes that allowed Canadian scientists to achieve a number of firsts: demonstrate one of the most sensitive isotope “purity” measurements ever made; characterizing the structure of beryllium-10; and probing the decay properties of rubidium-74, a key nucleus for testing the mixing of different quark flavours using nuclear decays.

TRIUMF’s Centre for Molecular and Materials Science facility conducted over 50 experiments exploring novel superconductors and semiconductors as well as studying the basic properties of niobium for its use in superconducting radio-frequency accelerating cavities.

Throughout the year, TRIUMF demonstrated consistent leadership in addressing the medical-isotope supply crisis. In August 2010, Western Economic Diversification (WED) Canada announced a $1 million investment in TRIUMF’s nuclear-medicine laboratories, WED’s first formal investment in TRIUMF for many decades. The new laboratories will greatly enhance TRIUMF’s capacity to produce radio-pharmaceuticals under Good Manufacturing Practice conditions (a regulatory standard of Health Canada) to facilitate clinical use. Then, in January 2011, Natural Resources Canada announced a $6 million award to a national team led by TRIUMF for demonstrating the production of the key medical isotope technetium-99m using conventional medical cyclotrons.

Under the leadership of TRIUMF scientist Makoto Fujiwara, Canadian researchers contributed to the successful creation and capture of antihydrogen in November 2010. The results were published in the journal Nature and were cited as the top physics result of 2010.

TRIUMF scientists also installed and commissioned key contributions to the Japanese neutrino experiment T2K including a series of detectors at the near side of the neutrino beam. In March 2011, the global collaboration announced evidence for the first observations of electron neutrinos appearing in a beam that started with only muon neutrinos. Canadian scientists joined the worldwide celebration.
Finally, TRIUMF scientists played leading roles in the international ATLAS experiment based at CERN’s Large Hadron Collider and contributed to the first physics results from that project including tantalizing hints about the Higgs boson. The Canadian ATLAS Tier-1 Data Centre at TRIUMF was ranked the best in terms of reliability and availability compared to its 9 peers around the world.

ADVANCE PARTICLE ACCELERATOR AND DETECTION TECHNOLOGIES...

TRIUMF’s new flagship, the Advanced Rare Isotope Laboratory and its key component, the e-linac, was launched in June 2010 with $30.7 million from the Government of British Columbia.

TRIUMF and its partners lost no time in moving ahead. The first stage of conventional construction is underway on the southwest corner of the TRIUMF site. The initial stage of the e-linac is being developed in conjunction with India. The design team signed off on schematics for the technical laboratory space that will house the isotope-production areas and underground beam tunnel. An international workshop held in January 2011 started to prioritize the research opportunities, which will be followed up with a second international workshop this July. In partnership with Japan, TRIUMF hosted the second KEK/TRIUMF accelerator-science symposium in October 2010.

The workhorse of TRIUMF, the 500 MeV main cyclotron, was designated one of Canada’s eleven Engineering Milestones by IEEE in the summer of 2010, followed by a formal dedication ceremony in December. The reliability and flexibility of the machine were cited as some of the distinguishing features.

TRIUMF and ACSI, Inc., form new partnership
Committed to continuous improvement of its core capabilities, TRIUMF designed and commissioned new isotope-production facilities in the ISAC facility including a conditioning station that facilitates “pre-flight testing” of target modules. In a feat of design and engineering, TRIUMF replaced and commissioned the vertical injection line for the main cyclotron, the main artery that carefully delivers hydrogen ions to the centre of the cyclotron where they begin their journey up to 75% of the speed of light.

Technical and engineering support was provided to the SNO+ and DEAP detectors based at SNOLAB. Funding from the Canada Foundation for Innovation of about $3.8 million was obtained by the University of Guelph for the GRIFFIN project, a new high efficiency gamma-ray spectrometer for decay studies of exotic nuclei at TRIUMF. The new spectrometer will increase the sensitivity for such studies by more than a factor of 300.

**TRIUMF supports learning and personal and professional growth and encourages independent thinking and everyone at TRIUMF knows that his or her work makes a difference**
FOR THE BENEFIT OF ALL CANADIANS...

A new partnership with Nordion, Inc., undertaken with NSERC’s Cooperative Research & Development program, resulted in a patent being filed for a potential new radiopharmaceutical compound.

PAVAC Industries, Inc., TRIUMF’s partner in transferring next-generation superconducting accelerator technology to Canadian industry, was awarded a Canadian Innovation Leader certificate by the Government of Canada.

TRIUMF also developed its relationship with Advanced Applied Physics Solutions, Inc., a federally supported Centre of Excellence for Commercialization and Research, which grew out of TRIUMF’s technology transfer program. New projects in isotope separation, radiation technologies, and geotomography are in progress.

BY THE NUMBERS:
EXCELLENCE WITH IMPACT

In the 2010–2011 fiscal year, TRIUMF:

- Shared the laboratory with 3,339 people for public tours including almost 1,000 students;
- Hosted 38 VIP visits including 1 foreign ambassador and 7 Canadian ministers;
- Provided educational and/or research work experiences for 6 high-school, 72 undergraduate, and 42 graduate students;
- Hosted more than 800 external visiting scientists;
- Authored or co-authored 198 scientific peer-reviewed publications;
- Supported 22 scientific experiments at ISAC in nuclear physics, 48 experiments at CMMS in molecular and materials science, and 4 experimental programs for life sciences and nuclear medicine;
- Operated the main cyclotron for 5,407 hours or almost 91% of scheduled performance;
- Delivered 2,628 hours of radioactive-isotope beams and 1,490 hours of stable-isotope beams to scientific experiments in its ISAC facility;
- Achieved 99% availability for the Canadian ATLAS Tier-1 Data Centre;
- Treated 7 patients with proton therapy in cooperation with the BC Cancer Agency (BCCA);
- Used its TR13 cyclotron to produce 468 runs of medical isotopes delivered to hospitals for research, 187 runs for medical isotopes to BCCA for the diagnosis of cancer patients, and 101 runs for isotope-production research and development;
- Produced up to 1.82 million patient doses (in partnership with Nordion, Inc.) of medical isotopes for commercial sale;
- Generated $2,628,668 of commercial revenue;
- Attracted 360,494 visits to its website and was followed by 760 people across social-media platforms (e.g., Twitter, Facebook, etc.); and
- Expanded its managing consortium to include 17 Canadian research universities (an increase of 2), 11 of which are full members.

Detectors for Japan’s T2K experiment tested at TRIUMF

An inside look at TRIUMF’s Meson Hall
Elsewhere in commercial agreements, TRIUMF re-invigorated its partnership with Advanced Cyclotron Systems, Inc. (ACSI), in Richmond, BC. ACSI grew out of the construction teams that built the original main cyclotron and now sells small medical-isotope cyclotrons across Canada and around the world. The new partnership agreement combines the intellectual leadership of TRIUMF with the technical and business acumen of ACSI for a globally competitive high-technology product.

Final agreements were put into place to combine $4 million from Japan with a Canada Foundation for Innovation award to the University of Manitoba for the construction of a new ultra cold neutron facility at TRIUMF. Construction of the new facility will begin in 2014 and will use the main cyclotron as its primary engine.

Under the leadership of TRIUMF scientist Jens Dilling, TRIUMF organized and hosted the world’s most prestigious nuclear physics conference—INPC 2010— in July. The conference attracted more than 800 delegates, most from outside Canada.

TRIUMF’s programs, scientific and technical staff, and affiliated personnel continue to earn national and international recognition for their talents and accomplishments. For example, several TRIUMF physicists were recognized by the American Physical Society, and a photograph of TRIUMF’s 8n nuclear-physics experiment won first place in an international juried photography competition.

TRIUMF has a diverse and enthusiastic community of employees, from scientists and engineers, to technicians and support staff. TRIUMF supports learning and personal and professional growth and encourages independent thinking and everyone at TRIUMF knows that his or her work makes a difference. This year TRIUMF’s human resources team won international praise at a professional meeting for its presentation on TRIUMF strategies for human-capital management and succession planning.

In addition, TRIUMF also conducted an employee survey and piloted a professional coaching program to train and develop staff.

Finally, the TRIUMF consortium of universities expanded to 17 research-intensive universities with the addition of the University of Northern British Columbia and the University of Winnipeg as associate members.

WHAT’S THE MATTER?

Star Trek and Angels & Demons are just two examples of how fiction has made antimatter famous. But scientists will quickly say that “warp drive” and “antimatter bombs” will only ever exist in fiction; they don’t have a basis in reality or the future. So why is the ALPHA team bothering with all the effort to trap anti-hydrogen atoms at CERN? The answer is because they think antimatter is boring—and they check to see if they’re right. Modern physics tells us that matter and antimatter are equal and opposite such that they mutually annihilate when brought into contact. If this were absolutely true, why didn’t all the matter and antimatter annihilate in the early universe...and leave nothing leftover from which stars, galaxies, and planets were born? Perhaps matter and antimatter actually behave slightly differently. ALPHA is using the anti-hydrogen atom as a laboratory: does anti-hydrogen have the same physical and chemical properties as ordinary hydrogen?
AS TRIUMF ENTERS THE SECOND YEAR OF ITS FIVE-YEAR PLAN, IT LOOKS FORWARD TO NEW CANADIAN AND INTERNATIONAL COLLABORATIONS, MAKING IMPORTANT DISCOVERIES, AND REALIZING THE FRUITS OF PAST INVESTMENTS AS NEW FACILITIES COME ONLINE.

ARIEL

Install and test hardware to begin commissioning e-linac system elements; Complete and move into new Stores Building; Break ground for ARIEL isotope-production hall and begin excavation; and prepare Electron Hall.

UPCOMING PLANS

ADDRESS THE MOST COMPELLING QUESTIONS...

Deliver unrivaled intensities of extreme neutron-rich isotopes to enable world-class research for nuclear-physics and materials-science studies; Expand nuclear-medicine research collaborations with Pacific Parkinson’s Research Centre, BC Cancer Agency, and commercial partners; Achieve integrated data goals for PiENu experiment; and Exploit and lead science opportunities in ATLAS at CERN and T2K in Japan.

ADVANCE PARTICLE ACCELERATOR AND DETECTION TECHNOLOGIES...

Enhance isotope production capacity at ISAC facility by installing and commissioning expanded target handling and testing facilities; Create and deliver heavy, rare isotopes using 10µA from main cyclotron on an actinide target, a global first; Complete and test new muon beam-line facilities at M-9A and M-20 to serve a growing user community; and Demonstrate within the CycloTech99 framework the capabilities for commercial-scale production of Tc-99m using existing medical cyclotrons.

FOR THE BENEFIT OF ALL CANADIANS...

Complete on-site MHESA nuclear-medicine laboratory where TRIUMF and Nordion, Inc. scientists will work alongside one another to develop medical isotopes of the future; Successfully renew core operating license from Canadian Nuclear Safety Commission; Complete design, install, and transition to new enterprise-resource planning system; Expand international science partnership and investment; Drive multiple successes for Advanced Applied Physics Solutions, Inc.; and Develop a strategic partnership with an external science outreach and education organization.
The March 31, 2011, financial statements presented in this report are for the first year of TRIUMF’s Five-Year Plan for 2010–2015. This first year brings unique challenges as the community selects and then commits to a strategy for best use of the available five years of funding to fulfill TRIUMF’s mission of “Accelerating Science for Canada.” Our job at TRIUMF is to fulfill that vision with a responsible use of the public’s money. In other words, the successful bridge from imagination to innovation requires integrity. This report illustrates TRIUMF’s success in these practices.

Every TRIUMF Five-Year Plan has unique characteristics and high aspirations. From where I sit, part of what distinguishes the 2010–2015 Plan from previous ones is the new level of partnership to which TRIUMF is committed. For instance, the number of different sources of funding and the number of national and international agreements has increased. This opportunity (seeking out the best with whom to join forces) also brings a new level of responsibility to TRIUMF because we must plan, manage, and account for our programs and activities to an ever larger group of stakeholders, in an expanded environment.

To date, TRIUMF’s management and the Canadian university community have been consistently effective in making the challenging choices about how best to fully deploy and exploit the resources provided through TRIUMF, and I am confident that we will continue to do so. Decisions have been made on which capital projects and experimental facilities will be built, on which experiments will be undertaken at TRIUMF, and on which experiments will be supported at international laboratories. Taken together, these decisions will keep Canada and Canadian researchers at the cutting edge of critical fields of science and technology. TRIUMF is always an exciting place to be, whether you are a young scientist or researcher exploring new extremes of nuclear physics, a technician building state-of-the-art equipment, or a Chief Financial Officer stretching the funding to ensure as many needs as possible are met. As the latter, I have enjoyed my many years at TRIUMF. Although I will be retiring effective April 1, 2011, I know my successor Henry Chen will find TRIUMF as challenging, fascinating, and exciting as I have.

Shirley Reeve  |  Chief Financial Officer

INDEPENDENT AUDITOR’S REPORT

To the Joint Venturers of TRIUMF

The accompanying summarized financial statements, which comprise the summarized statement of financial position as at March 31, 2011 and the summarized statement of expenditures and changes in fund balances for the year then ended, and related notes, are derived from the audited financial statements of TRIUMF for the year ended March 31, 2011. Those financial statements were prepared to comply with section 11b of the TRIUMF joint venture agreement and the contribution agreement with the National Research Council of Canada, and are prepared using the basis of accounting referred to in note 2 of the accompanying financial statements. We expressed an unmodified audit opinion on those financial statements in our report dated July 6, 2011.

The summarized financial statements do not contain all the disclosures required by the basis of accounting referred to in note 2 of the summarized financial statements. Reading the summarized financial statements, therefore, is not a substitute for reading the audited financial statements of TRIUMF.

Management’s Responsibility for the Summarized Financial Statements

Management is responsible for the preparation of a summary of the audited financial statements in accordance with the basis of accounting described in note 2 of the summarized financial statements.

Auditor’s Responsibility

Our responsibility is to express an opinion on the summarized financial statements based on our procedures, which were conducted in accordance with Canadian Auditing Standard (CAS) 810, “Engagements to Report on Summary Financial Statements.”

Opinion

In our opinion, the summarized financial statements derived from the audited financial statements of TRIUMF for the year ended March 31, 2011 are a fair summary of those financial statements, in accordance with the basis of accounting described in note 2 of the summarized financial statements.

Other Matters

These summarized financial statements, which have not been, and were not intended to be, prepared in accordance with Canadian generally accepted accounting principles, are intended for the information and use of the Joint Venturers and the National Research Council of Canada and may not be appropriate for any other use.

PricewaterhouseCoopers LLP

Chartered Accountants  |  Vancouver, B.C.  |  July 6, 2011
STATEMENT OF FINANCIAL POSITION

As at March 31, 2011

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FINANCIALS | 13
# STATEMENT OF EXPENDITURES AND CHANGES IN FUND BALANCE

For the year ended March 31, 2011

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<td>NORDION Inc. Fund</td>
<td>4,219,420</td>
<td>4,350,138</td>
</tr>
<tr>
<td>Advanced Applied Physics Solutions Inc. Fund</td>
<td>1,754,608</td>
<td>1,166,618</td>
</tr>
<tr>
<td>Canada Foundation for Innovation</td>
<td>5,580,147</td>
<td>1,946,096</td>
</tr>
<tr>
<td>Natural Resources Canada</td>
<td>700,238</td>
<td>–</td>
</tr>
<tr>
<td>Western Economic Diversification</td>
<td>–</td>
<td>918,964</td>
</tr>
<tr>
<td>Affiliated Institutions Fund</td>
<td>2,110,304</td>
<td>2,191,470</td>
</tr>
<tr>
<td>Commercial Revenue Fund</td>
<td>2,628,668</td>
<td>2,338,207</td>
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<tr>
<td>General Fund</td>
<td>98,063</td>
<td>60,947</td>
</tr>
<tr>
<td>Intramural Accounts Fund</td>
<td>1,275,087</td>
<td>1,442,797</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>70,308,116</td>
<td>65,002,823</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Expenditures</strong></th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings and improvements</td>
<td>847,283</td>
<td>334,315</td>
</tr>
<tr>
<td>Communications</td>
<td>190,173</td>
<td>245,542</td>
</tr>
<tr>
<td>Computer</td>
<td>2,049,025</td>
<td>1,203,207</td>
</tr>
<tr>
<td>Consulting</td>
<td>2,390,710</td>
<td>1,347,242</td>
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<tr>
<td>Facility conformity costs</td>
<td>–</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Equipment</td>
<td>5,251,722</td>
<td>4,342,100</td>
</tr>
<tr>
<td>Power</td>
<td>2,608,866</td>
<td>2,551,233</td>
</tr>
<tr>
<td>Salaries and benefits</td>
<td>40,281,034</td>
<td>40,102,553</td>
</tr>
<tr>
<td>Supplies and other expenses</td>
<td>10,720,245</td>
<td>11,527,208</td>
</tr>
<tr>
<td>Travel</td>
<td>1,847,246</td>
<td>1,833,428</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>66,186,304</td>
<td>64,486,828</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Surplus of funding over expenditures for the year</strong></th>
<th>2011</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4,121,812</td>
<td>515,995</td>
</tr>
</tbody>
</table>

**Fund balances - Beginning of year**: 3,876,173

**Fund balances - End of year**: 7,997,985
NOTES TO FINANCIAL STATEMENTS

1 | Nature of operations
TRIUMF is Canada’s national laboratory for particle and nuclear physics, owned and operated as a joint venture by the University of Alberta, Carleton University, the University of Guelph, Queen’s University, the University of Manitoba, the University of Victoria, Simon Fraser University, the University of British Columbia, l’ Université de Montréal, the University of Toronto and York University, under a contribution from the National Research Council of Canada. As a registered charity, TRIUMF is not subject to income tax.

At March 31, 2011, each university owned an undivided 9.09% interest in all the assets and was responsible for 9.09% of all liabilities and obligations of TRIUMF, except for the land and buildings occupied by TRIUMF, which are owned by the University of British Columbia.

These financial statements include only the assets, liabilities, funding and expenditures of the activities carried on under the control of TRIUMF and do not include the other assets, liabilities, revenues and expenditures of the individual joint venturers.

Sources of funding include grants and contributions from the National Research Council of Canada, the Natural Sciences and Engineering Research Council, and governments; advances and reimbursements from other sources; royalty income; and investment income. TRIUMF has established a number of separate funds to account for the various funding sources. The sources and purposes of these funds are:

National Research Council Fund (NRC)
Funding of operations, improvements and development; expansion of technical facilities (buildings excluded); and general support for experiments.

Natural Sciences and Engineering Research Council Fund (NSERC)
Funding to grantees for experiments related to TRIUMF activities. These funds are administered by TRIUMF on behalf of the grantees.

British Columbia Knowledge Development Fund
Funding provided for the civil construction of buildings. These funds are provided by the Province of British Columbia through the university members of the TRIUMF joint venture.

NORDION Inc. Fund
Advances and reimbursements from NORDION Inc. for expenditures undertaken at its TRIUMF site.

Advanced Applied Physics Solutions Inc.
Advances and reimbursements from Advanced Applied Physics Solutions Inc. for expenditures undertaken at the TRIUMF site.

Western Economic Diversification (WED)
Funding for capital projects related to TRIUMF activities, specifically for the construction of a Good Manufacturing Practices (GMP) laboratory for TRIUMF’s Nuclear Medicine Division.

Natural Resources Canada (NRCan)
Funding for capital projects related to TRIUMF activities, specifically for proof-in-principle that specific medical isotopes currently produced by nuclear reactors can be produced by cyclotrons.

Canada Foundation for Innovation (CFI)
Funding to Canadian universities for capital projects related to TRIUMF activities. These funds are administered by the universities and TRIUMF is reimbursed for expenditures undertaken in accordance with the terms of the grant.

Affiliated Institutions Fund
Advances and reimbursements for expenditures undertaken on behalf of various institutions from Canada and abroad for scientific projects and experiments carried out at TRIUMF.

Commercial Revenue Fund
Royalties, revenue and expenditures relating to commercial activities and technology transfer.

General Fund
Investment income for discretionary expenditures incurred by TRIUMF.

TRIUMF House Building Fund
Contributions from unrestricted funds and expenditures for the construction of TRIUMF House.

Intramural Accounts Fund
Net recoveries for internal projects and services. The recoveries of expenditures are charged to the appropriate TRIUMF funding source by Intramural Accounts.

2 | Significant accounting policies
Basis of presentation
These summarized financial statements have been prepared in accordance with section 11b of the TRIUMF joint venture agreement and the contribution agreement with the National Research Council of Canada, and follow Canadian generally accepted accounting principles for not-for-profit organizations as referred to in the Canadian Institute of Chartered Accountants (CICA) Handbook, except that all property, plant and equipment purchased or constructed for use at TRIUMF, related decommissioning costs (if any) are expensed in the period in which the costs are incurred, and they do not include all disclosures as required by Canadian generally accepted accounting principles.

These summarized financial statements do not include the accounts of TRIUMF Accelerators Inc. (TAI), a not-for-profit federal corporation incorporated in 2006 and controlled by TRIUMF. The only asset held by TAI is the operating license issued by the Canadian Nuclear Safety Commission, which was recorded at the exchange value of $nil. Since inception TAI has not incurred any expenses or liabilities and has not recognized any revenue.
GOVERNANCE STRUCTURE

TRIUMF is Canada’s national laboratory for particle and nuclear physics. It is owned and operated as a joint venture by a consortium of Canadian universities via a contribution through the National Research Council Canada with building capital funds provided by the Government of British Columbia. Situated on 12.5 acres on the south campus of UBC in Vancouver and founded more than 40 years ago, TRIUMF presently employs about 450 staff and students.
ACKNOWLEDGEMENTS
TRIUMF’s activities are largely supported by contributions from the following organizations:

- Canada Foundation for Innovation
- Canadian Institutes of Health Research
- Genome BC
- Government of British Columbia
- Government of Canada
- Industry Canada
- National Research Council Canada
- Natural Resources Canada
- Natural Sciences and Engineering Research Council
- Networks of Centres of Excellence of Canada
- Western Economic Diversification Canada

SELECTED PARTNERS
TRIUMF works with many individuals, organizations, educational institutions, and private companies to fulfill its mission. These include:

Canada
Advanced Applied Physics Solutions, Inc.
Advanced Cyclotron Systems, Inc.
BC Cancer Agency
Canadian Institute for Nuclear Physics
Canadian Light Source, Inc.
Canadian Space Agency
CANARIE
Centre for Probe Research and Development
D-Pace, Inc.
General Electric
Institute of Particle Physics
Lawson Health Research Institute
Nordion, Inc.
Ottawa Heart Institute
Pacific Parkinson’s Research Centre
PAVAC Industries, Inc.
Positron Emission Tomography Imaging at UBC
Selkirk College
SNOLAB

International
Argonne National Laboratory, Argonne, USA
Brookhaven National Laboratory, Upton, USA
China Institute of Atomic Energy, China
Deutsches Elektronen-Synchrotron (DESY), Hamburg, Germany
European Organization for Nuclear Research (CERN), Geneva, Switzerland
Fermi National Accelerator Laboratory, Batavia, USA
GANIL, Caen, France
Gesellschaft für Schwerionenkunde mbH (GSI), Darmstadt, Germany
High Energy Research Organization (KEK), Tsukuba, Japan
Institut des Sciences Nucléaires (ISN), Grenoble, France
Institute for Nuclear Research (INR), Russia
Istituto Nazionale di Fisica Nucleare (INFN), Italy
Japan Atomic Energy Agency (JAEA), Tokai, Japan
Japan Proton Accelerator Research Complex (J-PARC), Tokai, Japan
Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany
Lawrence Berkeley National Laboratory, Berkeley, USA
Lawrence Livermore National Laboratory, Livermore, USA
Los Alamos National Laboratory, Los Alamos, USA
National Superconducting Cyclotron Laboratory (NSCL), East Lansing, USA
Oak Ridge National Laboratory (ORNL), Oak Ridge, USA
Paul Scherrer Institut (PSI), Switzerland
Rutherford Appleton Laboratory (RAL), UK
RIKEN Nishina Centre for Accelerator-Based Science, Wako, Japan
SLAC National Accelerator Laboratory, Stanford, USA
Thomas Jefferson National Accelerator Facility, Newport News, USA
Toyota Central R&D Labs, Inc.
UT-Batelle, LLC, USA
Variable Energy Cyclotron Centre, Kolkata, India

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ATLAS = CERN
ALPHA = C. So