Canadian Nuclear Safety Commission

Commission canadienne de sûreté nucléaire

Public hearing

Audience publique

TRIUMF Accelerators Inc.:
Application by TRIUMF Accelerators Inc. for Renewal of their Class IB Particle Accelerator Operating Licence

TRIUMF Accelerators Inc. :
Demande présentée par TRIUMF Accelerators Inc. pour le renouvellement de son permis d'exploitation d'accélérateur de particules de catégorie IB

May 2nd, 2012

Le 2 mai 2012

Public Hearing Room
14th floor
280 Slater Street
Ottawa, Ontario

Salle d'audiences publiques
14e étage
280, rue Slater
Ottawa (Ontario)

Commission Members present

Commissaires présents

Dr. Michael Binder
Mr. Dan Tolgyesi
Ms. Rumina Velshi
Dr. Ronald Barriault
Mr. André Harvey

M. Michael Binder
M. Dan Tolgyesi
Mme Rumina Velshi
M. Ronald Barriault
M. André Harvey

Secretary:

Secrétaire:

Mr. Marc Leblanc

M. Marc Leblanc

Senior General Counsel :

Avocat général principal:

Mr. Jacques Lavoie

M. Jacques Lavoie

--- Upon resuming at 11:21 a.m./

L’audience est reprise à 11h21

TRIUMF Accelerators Inc.:
Application by TRIUMF
Accelerators Inc. for Renewal of
Their Class IB Particle Accelerator
Operating LIcence

THE CHAIRMAN: Okay. Welcome, everybody. We are proceeding with the next item on the agenda for today, which is the application from TRIUMF Accelerators Inc. for the renewal of their Class 1B particle accelerator operating licence.

You notice that Dr. McDill is not with us. She excused herself because Carleton University is a member of this venture or consortium and, therefore, she felt she better be off.

So I'll turn over to Marc.

MR. LEBLANC: Thank you.

So this is a one-day public hearing. The Notice of Public Hearing was published on February 7th. Submissions from TRIUMF and CNSC staff were due and filed by March 2nd. The public was invited to participate either by oral presentation or written submission. April

2nd was the deadline set for filing by intervenors, and we received no requests for intervention.

April 25th was the deadline for filing of supplementary information, and I know that presentations have been filed by CNSC staff and TRIUMF.

Mr. President.

THE CHAIRMAN: Thank you, Marc.

So let's start by calling on the presentation from TRIUMF Accelerators Inc. as outlined in Commission Member Document 12-H5.1 and H5.1A.

And I understand, Dr. Lockyer, you will make the presentation. Please proceed.

12-H5.1 / 12-H5.1A
Oral presentation by
TRIUMF Accelerators Inc.

DR. LOCKYER: Thank you very much.

Good morning. My name is Nigel Lockyer. I am the President and CEO of TRIUMF Accelerators Inc. I'd like to introduce the team we have here with us today.

So on my right is the Vice-President of Safety, Anne Trudel. On my left is Rob Thompson, who's the Chair of the Safety and Security Committee of the Board. We have Vice-President of Security, Jim Hanlon.

Jim, put your hand up. Thank you.

We have the Treasurer, Henry Chan; Quality Assurance Manager and Training, Phil Jones, and Joe Mildenberger, who is Head of Radiation Protection Group.

We also have TRIUMF counsel with us, Jacques Shore, and Wayne Warren.

Okay, so you'll be hearing about TRIUMF from myself; you'll hear about the summary of the regulatory program from Anne Trudel, and a couple of words from Rob Thompson on the view of the Board.

So the first slide which we see -- okay. The first slide has three pictures on the right, and the top picture indicates the -- it's the inside of the TRIUMF cyclotron. It's the world's largest cyclotron, and it's the workhorse of our programs.

All of our programs at TRIUMF derive from an accelerator in some form or other.

The second picture is a picture of the ATLAS experiment in Switzerland, CERN Geneva. And TRIUMF Built part of that accelerator. We built part of that experiment that you're looking at. And that picture represents the particle physics program we have in supporting Canadian scientists around the world.

The bottom picture there is a picture of a small medical isotope producing cyclotron. It's quite

small. It's the size of a large desk, if you like. And that's designed by TRIUMF, manufactured in Canada and sold around the world.

The picture on the left is an artist's rendering of our future facility, which we refer to as ARIEL, and I'll talk about that in a little bit.

Okay. So TRIUMF is a national science laboratory. It's owned and operated by a consortium of 17 universities. It was founded 43 years ago. It's located in Vancouver on the campus of the University of British Columbia. There are 11 full members and six associate member universities.

The research focus is summarized in those two bullets, advancing isotopes for science and medicine, probing the structure and origins of matter.

This is the organization chart of TRIUMF Accelerators Inc. along with the TRIUMF Board of Management picture, so it's a little complicated. But basically, TRIUMF Accelerators Inc. holds the licence, and there are four officers which are listed there. And it's the 11 full member universities -- it's their members on the TRIUMF Board which act as Directors on TRIUMF Accelerators Inc.

Okay, so the vision for TRIUMF. TRIUMF will lead in science, leverage university research,

connect Canada to the world and create social and economic growth.

The ARIEL project, which is our future of TRIUMF in some sense, is shown on this slide. It's -- it consists of constructing a new accelerator and a high power electron linear accelerator using superconducting technology developed here in Canada.

It provides beams to one of three facilities, low energy, medium energy and high energy. And once we have both the cyclotron and the ELINAC, as we refer to it, running, that will be a unique facility in the world being multi-user for producing rare isotope beams.

Next slide shows you the ARIEL site preparation. So if you look in the lower right-hand corner we've now commissioned and are using a new badge room that -- badge room is an upgrade from what we used before. It stops tailgating, as it's referred to. There's a separate in and a separate out throughway, so it's been a big improvement.

To the left of that so-called compressor building and excavation area is under preparation for construction. In the back there, you see the new stores building. So we had to make room on the site in order to build the ARIEL building itself. And you can see that

they're just preparing the -- and completing the excavation there in that upper right-hand picture.

Okay, so the ATLAS experiment at CERN has about 2,500 scientists involved in it. Canada represents four percent of that collaboration. The -- part of the detector was built at TRIUMF. The -- part of the accelerator was built at TRIUMF. The data is stored in 10 facilities around the world, of which Canada hosts one of those facilities, and TRIUMF is one of those facilities.

We now have the ability to store about seven petabytes of data, so that's the largest academic storage of data in Canada.

On the next slide, I just show you one of the main physics goals for the ATLAS experiment, and that's to discover the Higgs Boson. You perhaps read about it in the newspaper. The Higgs Boson is the particle associated with the mechanism that produces mass for guarks and leptons, and is viewed by many as probably the discovery of the century, if I can exaggerate, if it takes place. And the laboratory is saying that it will either find it this year, or they will determine that it doesn't exist.

The next slide is showing you a picture of a beam that travels through Japan. It starts on one side at the J-PARC facility and ends on the other side 300

kilometers away. The beam travels through a detector on the front end, and two- thirds of that detector was built at TRIUMF by Canadian scientists.

And that experiment up until the earthquake was the world's best measurement in terms of understanding these parameters of neutrinos; and they're very important for understanding the evolution of matter in the universe. The facility is now back online after having been off for about a year due to damage to the earthquake and operating well.

The next picture is a blow-up. The one you see on the first slide, it's a person sitting inside of the TRIUMF cyclotron. At the bottom there I mention two awards we've received recently. The IEEE, Engineering Milestone Award in Canada. There are 11 in the history of Canada. The first one went to the first radio transmission from London to Newfoundland. The second one was to the first telephone conversation between Alexander Graham Bell and his sister. The third one was the cable underneath the Atlantic. And the 11th was the TRIUMF cyclotron. So we're in a very exclusive club and we're very proud of that.

We just received an award this year for the 125th anniversary from the Engineering Institute of Canada. The CN Tower was a recipient. The Confederation

Bridge was a recipient. The RIM Blackberry was a recipient, and the TRIUMF cyclotron was a recipient. They gave out six awards. So again, we're very pleased to be in that group.

The next slide is just a list of laboratories around the world that our accelerator division collaborates with. So TRIUMF's accelerator division has about 140 people in it. We design and build accelerators. We're trying to build at the State of the Art, and they're the top laboratories around the world that we work with.

And that does not include our international collaborations for the science program, that is strictly just the accelerator program.

The next slide talks about the nuclear physics' highlights. This is the program driven by the TRIUMF cyclotron. In the upper left there it says,

> "Nuclear structure, nuclear astrophysics and fundamental symmetries."

Nuclear astrophysics is the only one I'll mention, but basically that is the subject of asking, where did the chemical elements come from? Where is the copper in your body produced in the universe? Where is uranium produced? Where is gold produced?

And so there's a number of options there. It may be the merger of neutron stars. It may be the explosion of a star, a supernova. And it's the details of that explosion that TRIUMF tries to reproduce by producing beams of rare isotope beams.

Rare isotope beams are very uncommon in the world. There are many, many nuclear physics facilities that have beams of stable isotopes, but only a handful who make unstable isotopes; and TRIUMF is one of the leading facilities in the world for that.

The next slide indicates our nuclear medicine program. And again in the upper left is a picture of a small medical cyclotron. TRIUMF also uses its main cyclotron to treat patients for ocular melanoma in collaboration with the BC Cancer Agency.

The next picture of a radio tracer, if you like, is used in the study of Parkinson's disease. The next picture is a -- we refer to them as rigs. They're boxes which combine chemicals with a radiotracer and give you a final product that's ready to be injected into a human being.

And the bottom three slides on the left are related to our program for producing technetium-99m in that small medical cyclotron in the upper left, and the bottom right is a PET scan of a Parkinson's patient.

Okay. So I'll pass it over to Anne now. So go ahead.

MS. TRUDEL: Anne Trudel, VP Safety for TRIUMF Accelerators Inc. I'll address our regulatory program summary.

I'll focus on safety control areas that have the highest risk rating, and as well those safety and control areas where we've made significant progress over the last five years of our operating licence.

I'll also highlight the degree to which personnel outside of the immediate group of Environment Health and Safety have been involved with the progress made in the safety control areas. And this attests to the resources that the organization's made available to implement our regulatory programs and essentially allow us to conduct our operation while ensuring the protection of the environment, health and safety of personnel, members of the public and maintaining national security.

The first slide on quality management systems. Significant progress has been made with updating the framework for and implementation of QMS over the last five years. The 13 TRIUMF standard operating procedures have been revamped to capture all the processes governing TRIUMF licensed activities.

This implementation is managed and

supported by the QA manager. The QMS Core, which is chaired by our engineering division head, and that consists of seven members. As well we have a QMS implementation panel.

There's been training, there have been newsletters in terms of distributing the information throughout the organization to achieve the progress we've made. We have a regular annual schedule of internal audits. We have some new tools that we've deployed to help with implementation. And most importantly we have annual QMS goals and objectives in place and metrics used to measure that performance. We report on that quarterly at our Safety Management Committee meetings.

So an ongoing commitment to QMS and the framework in place for continual improvement.

The next slide is a summary of one of our standard operating procedures quality program assessment.

And I've got it here because it demonstrates the oversight that's in place for safety at the organization. Starting from the top we have the Board of Management Safety and Security Committee. Following with that we have the Safety Management Committee that meets quarterly, chaired by our director.

Moving on we have the joint employer provincially mandated workplace safety committee; it's

called TAPC. We carry out management walkthroughs quarterly. And then we have our Office of Environment Health and Safety that has the responsibility for managing our safety programs; and that consists of 15 physicist, engineers and technicians.

Moving onto the safety control area of human performance management. TRIUMF has a systematic approach to training program implemented for all workers on site. The training manager has the responsibility for development and implementation of the systematic approach to training program. And he is supported by the training implementation panel that's chaired by the science division head, and again consists of seven members across the whole organization.

Our training program, as you can see from the table on the right, top right, consists of three components. The site safety orientation, radiation and conventional safety is completed for all workers on site. And below the table you can see an excerpt from our individual training plan where the workers, supervisor, and/or contract, TRIUMF contact would fill that out and indicate what training is required.

We train about 300 to 400 people annually. As well our training program includes operator training. We have 41 operators for all of our Class 1 and Class 2

facilities that are trained.

And lastly, we have job-specific training where we're in the process of a formal systematic approach to training implementation for that component of our program. And that's the one outstanding action notice that we're continuing to make progress on.

The next slide speaks to operating performance. We've continued to improve our processes for managing operating performance. We have a fault reporting system in place for all of our cyclotron facilities. We have had a non-conformity database in place since 2006. And on the right, top right in the table you can see essentially the reporting of non-conformities by quarter for the last five years.

The increase that you see in 2010 corresponds to the capturing of non-conformities associated with our own internal audit processes that we started doing in 2010.

As well, in 2010, we look to add tracking of corrective actions to the non-conformity database. There’s room for improvement there. On the bottom you can see the graph that shows the tracking of non-conformities -- sorry, the tracking of corrective actions by quarter, in terms of completion.

So we’re continuing to address the

improvements that are required in terms of ensuring a timely and effective manner of completing corrective actions.

The next slide addresses a safety analysis and physical design. Each of TRIUMF's facilities has a completed safety analysis in place.

The most significant hazard for personnel onsite associated with the cyclotron facilities comes from prompt radiation and we have three ways of mitigating that hazard.

The slide on the top -- the picture on the top right shows those three different methods. We have a shielding in the form of soil or concrete; we have an access control system to exclude people from areas where the radiation fields may be too high, as seen in the electrical room, and then lastly at the outside where we have -- where personnel can be, we have our radiation monitoring system that will generate an alarm if the fields fluctuate and will eventually trip the machine off if the fields exceed the trip level.

In terms of a hazard for offsite, the most significant source of that hazard comes from the residual radiation associated with our gaseous activity from production targets. And the chart on the lower right shows the dose associated -- that would be associated with

a worst-case release from those production targets, and we can see that the maximum dose to a member of the public from such a worst-case scenario would be 0.2 millisieverts.

Moving on to radiation and conventional safety, radiation and environmental protection programs continue to be well managed. Personnel dose has remained low, despite ongoing increases in operating levels, both at ISAC and the isotope productions cyclotrons. The average nuclear energy worker dose for the last five years is about 1 millisievert.

As well, on the environmental protection front, we've been able to capitalize on the use of the Health Canada detector that's close to our site and in the analysis of that data we've been able to demonstrate that the dose impact from our most significant emissions, the air activation from the cyclotron amounts to about two to three times less than what we would estimate conservatively with our derived release limits.

Lastly, with regard to conventional safety, the graph on the bottom shows days of lost time per year in blue for TRIUMF and then the B.C. university's, which is our provincially -- our Provincial Health and Safety Board compares us essentially to that group.

And we can see the increases in 2009 and

2011 have been associated with a few injuries. The most significant one in 2011 involved a fall from the beam line one shielding blocks. And as a result of the root cause analysis that was done and the corrective actions we've put in place we've looked to expand our fall protection program to include fall arrest equipment for work on the shielding blocks.

Other safety control areas where we've made significant progress over the last five years; the fire protection program now complies -- fully complies with NFPA 801. We have a site fire hazard analysis in place. Our fire protection program documents include a full suite of procedures for inspection testing and maintenance for all fire protection systems.

With respect to the TRIUMF request in our CMD, we've received clarification from CNSC staff on the third party review requirements for modifications and our concerns essentially have been addressed with that input.

We've made significant progress as well with our waste management program. It has been revised completely to comply with regulatory clearance levels. We've made some upgrade to our shielded monitoring cave used for monitoring our low-level waste. And we've revised our program documents and we've just received word from CNSC staff this morning that those revisions have

been accepted.

Lastly, with regard to decommissioning and financial guarantees, we've revised the preliminary -- we're in the process of revising the preliminary decommissioning plan for ARIEL, and in preparing that revision we also made the revision for -- to upgrade from 2007 to 2011 dollars. So the new total is 44.2 million.

And as well the financial guarantee instrument has been reviewed and you can see from the graph on the bottom that shows, essentially, the fund balance as a function of expenditure during the 45-year decommissioning period. So the fund balance is adequate.

Thank you.

MR. THOMPSON: My name is Rob Thompson; I'm the University of Calgary representative on the TRIUMF Board of Management and Chair of the board's Safety and Security Committee.

I am here to speak briefly on the board's view on the safety and security matter.

As Nigel mentioned previously, TRIUMF is owned and operated by a consortium involving 17 Canadian universities.

The TRIUMF board takes oversight of safety and security very seriously and has maintained a proactive approach to this oversight.

The principle mechanism is there is a standing item on the board docket on safety and security which involves the report from the chair of the Safety and Security Committee.

This committee, which is made up of board members, external experts and the relevant TRIUMF experts, meets regularly in between board meetings and then presents an overview of safety and security issues and status to the board at each meeting.

The board chair presentations are supplemented as needed, as identified by the -- sorry, the Safety and Security Committee chair presentations are supplemented as needed, as identified by the Safety and Security chair or the board chair by presentations from relevant TRIUMF experts on any issues that may be coming up or ongoing.

Thank you.

DR. LOCKYER: Okay, so the next slide is discussing a future program for TRIUMF. So we're looking to capture the heat from the accelerator. So the accelerators, if you look at the bottom of the slide, produce sum total once the ARIEL project is on line about 10 megawatts of heat. That accounts for about 25 percent of the power that's used by the University of British Columbia, the entire campus.

So we're looking to use that warm water to heat the local residents in the campus. The university has just approved converting their steam heat to water heat. So this is a part of the sustainability program that UBC is pursuing.

If we can do this on time, which means in the next couple of years, we'll be the first facility in the world to do heat recovery and use it to heat the local neighbourhood.

Okay, we also have an active community outreach program. So TRIUMF has engaged the local university neighbourhood association, including an annual presentation to the UNA board and meeting with the executive. Part of TRIUMF's mission is to inspire today's youth in science through education and outreach.

We have tours, we participate in events in the local area, we have public lectures, we have movie night, we have Saturday morning high school physic lectures and so on.

We're also engaging the local First Nations Musqueam Band. We've had two students engaged in summer research, high school students, and we're now sitting down with them to develop a joint program.

In summary, TRIUMF regulatory programs are in good standing for all safety and control areas. Future

expansion with ARIEL is not anticipated to impact negatively any of the safety and control areas.

A 10-year operating licence is required -- is requested -- it’s not required but it would be nice -- demonstrated good safety record; regulatory programs are well integrated into the QMS system.

TRIUMF is poised to complete its future projects in a manner consistent with regulatory requirements. And we know from experience that a 10-year outlook will reassure the Government of British Columbia and our stakeholders and allow TRIUMF to better negotiate longer term investments and projects with our international partners, which tend to be greater than five years.

THE CHAIRMAN: Thank you.

Before opening up the floor for questions I'd like to hear from CNSC which make -- to hear the CNSC presentation as outlined in CMD 12-H5. And I understand, Mr. Régimbald you'll make the presentation.

Please proceed.

12-H5

Oral Presentation by

CNSC staff

M. RÉGIMBALD: Merci monsieur le président et bonjour membres de la Commission. Je m'appelle André Régimbald, je suis le Directeur général responsable de la réglementation des substances nucléaires.

With me today are Ms. Kavita Murthy, Director of Accelerators and Class II facilities division, and Mr. Jeff Sandeman, Senior Project Officer in Ms. Murthy's division, responsible for TRIUMF.

Also present are the subject matter experts from the CNSC who have participated in the regulatory activities for this facility.

I'll pass the microphone to Kavita to continue.

MS. MURTHY: Good morning, Mr. President, members of the Commission. For the record my name is Kavita Murthy.

This presentation reviews CNSC's staff assessment of TRIUMF Accelerator Incorporated's application to renew its Class I particle accelerator operating licence for a period of ten years commencing on July 1st, 2012. TRIUMF's present operating licence expires on June 30th, 2012.

The CNSC staff presentation will start with a brief overview of the licensee's operations. This will be followed by a summary of TRIUMF's licensing history and

a review of their compliance record.

These, combined with CNSC staff's assessment of the information submitted by the licensee in support of the licence renewal, form the basis of CNSC staff's recommendations in this regard.

Please note that TRIUMF's security program is the subject of separate CMD which will be discussed in-camera due to the confidential nature of that information. It is CNSC staff's recommendation today that the operating licence for TRIUMF be renewed for the requested period of ten years.

Mr. Jeff Sandeman will make the remainder of the presentation.

MR. SANDEMAN: Jeff Sandeman, for the record. Senior Project Officer Accelerator in Class II facilities division.

I'll begin by providing some background context regarding who TRIUMF is and the nature of the facilities operated on TRIUMF's site.

TRIUMF is Canada's National Research Centre for particle and nuclear physics. In addition to its primary role as a physics research facility, TRIUMF is also a major producer of medical isotopes.

These are produced in partnership with both Nordion and the British Columbia Cancer Agency. Isotopes

produced by the accelerators at TRIUMF are processed and packaged for shipment across North America at an independently licensed isotope processing facility owned by Nordion located on the TRIUMF site.

Nordion's processing facilities are operated under a completely separate CNSC licence. They do not fall within the scope of TRIUMF's operating licence.

TRIUMF has also partnered with four other Canadian agencies under the non-reactor based isotope supplier program, or NISP, to develop a cyclotron based system to enable medical radio isotope technetium-99m to produce locally in existing hospital base cyclotrons across Canada.

So exactly what is TRIUMF Accelerators Inc.? It's the accelerator part of the name which is key to understanding triumph.

Accelerators are electronic devices which use electric fields to accelerate charged particles, such as electrons or protons to very high energies. These particles are then used to bombard a target material which is chosen according to the desired experiment or the isotope to be produced.

This is the same basic operating principle which is used in diagnostic x-ray machines in hospitals

and clinics which almost everyone has seen at some point in their life.

As with x-ray machines, the main radiation hazard from an accelerator is the prompt radiation which is produced when the beam of particles impacts upon the target material.

As the name implies prompt radiation is instantaneous appearing when the accelerator is turned on and disappearing when it's switched off.

Unlike diagnostic x-ray machines, however, accelerators can be used to produce radioactive isotopes in the target materials that are radiated by selecting the right combination of charged particles, beam energy and target material.

It is very important to note that accelerators are totally different from reactors. There is no nuclear fuel, they do not operate using fission, and there is no criticality involved.

As a result the radiation hazards presented by accelerators are very different from those from reactors. For example once the beam is off the primary radiation hazard is gone. There is no fuel which would require continuous cooling following a shutdown of an accelerator.

There are many different types of

accelerators as well. Triumph operates two different types known as cyclotrons and linear accelerators. Cyclotrons use a magnetic field generated by two large circular magnetic poles to bend the charged particle path into a spiral. Acceleration is achieved by applying electric field across a narrow gap between two electro chambers which are sandwiched between the magnetic poles. Once these charged particles reach the desired energy they are extracted down a hollow tube called a "beam line". They then travel down that beam line to strike the target. TRIUMF operates five different cyclotrons on their site.

The main high energy cyclotron is a 520 million electron volt proton accelerator which is 18 metres in diameter.

The photograph on the left shows a cyclotron under construction in 1970. This cyclotron is the primary research tool and is what makes TRIUMF truly unique. There are no other comparable cyclotrons anywhere in the world. It has the capacity to simultaneously extract multiple beams of protons at different energies down different beam lines.

Most of these beam lines are used for research, but some are also dedicated to producing certain types of medical radio isotopes.

In addition, TRIUMF operates four lower

energy cyclotrons, two of which the TR30-1 and TR13 are shown here. The four lower energy cyclotrons are all dedicated to the production of medical isotopes.

The TR30-1 is used to produce conventional nuclear isotopes such as thallium-201, which is used to detect coronary artery disease.

The TR13 is what is known as a PET cyclotron, because it is dedicated to the production of positron emitting isotopes needed for positron emission tomography; these are used in cancer diagnoses and the detection of heart disease.

TRIUMF also operates two linear accelerators. As the name implies a linear accelerator is simply one which accelerates charged particles in a straight line. These are used to accelerate heavy ions for research purposes.

These heavy ions are created by bombarding special targets with the proton beam from the main cyclotron. TRIUMF's existing two linear accelerators are known as isotope separator and accelerators I and II, or ISAC-I and II for short. A section of ISAC-II is shown in the photograph here.

In March of 2012 TRIUMF also submitted a separate licence application to construct a new electron linear accelerator facility known as the advanced rare

isotope laboratory or ARIEL.

The construction licence application for ARIEL is not part of the operating licence renewal. It is currently being reviewed by CNSC staff assuming that technical analysis determines that the application is acceptable a separate construction licence will be issued.

So now that we have some background into what TRIUMF does I'll review some of our relevant licensing history for this facility.

TRIUMF has been licensed to operate by the CNSC and formally the Atomic Energy Control Board since 1974. At the last full renewal of TRIUMF's operating licence was for a five-year period commencing on April 1st, 2007 and ending on March 31st, 2012.

A short term three month renewal was granted via an abridged hearing earlier this year, in order to provide additional time to assess the extensive renewal application which is the subject of this hearing. During the previous licence renewal hearing in 2007 there were several key issues that were identified as requiring action by TRIUMF, during the ensuing licensing period.

In particular licence conditions were included to address the following items: TRIUMF accelerators incorporated had recently been incorporated but the legal documentation had not yet been finalized. A

financial guarantee was not yet in place and there had not previously been any specific fire protection requirements in the licence.

The new licence conditions each contained transitional provisions allowing TRIUMF time to complete the necessary actions.

In addition to these items it was noted at the time that the implementation of TRIUMF's quality assurance program was not entirely satisfactory.

Subsequent to the renewal of the operating licence in 2007 TRIUMF submitted the finalized legal documentation related to incorporation within one year as required.

A financial guarantee was established and was approved by the Commission via separate in December 2007. The fire safety and quality assurance concerns were also addressed during licensing period.

More details regarding the specific actions taken to address these two issues will be provided later in the presentation.

During this licensing period, seven minor licence amendments have been assessed and approved, all via the abridged hearing process.

These included three separate amendments related to the development, testing and ongoing operation

of a new accelerator target system used in conjunction with the ISAC facilities. This target system expended TRIUMF's research capability by enabling the production of certain types of previously available -- unavailable -- rare isotope beams.

Two other amendments involve site preparation activities, related to the future construction of ARIEL. The remaining two amendments related to minor alteration to the layout, use and occupancy of a part of an exclusion area within the ISAC II vault, and to the aforementioned three-month renewal.

One common aspect of these amendments is that almost all are associated with the dynamic, ever-evolving nature of TRIUMF's operations. New projects are constantly being developed and the licensing framework must be able to address these changes in an efficient and timely manner.

In their operating licence renewal application, TRIUMF has requested the licence be renewed for a ten-year period. The application did not include requests for any significant changes to the design and operation of TRIUMF'S accelerator facilities, and the content of the application satisfied CNSC regulatory requirements for licence applications.

There are many compliance and verification

activities conducted by CNSC staff to ensure TRIUMF continues to comply with the terms and conditions of the operating licence. Results of these activities form an essential part of a review of TRIUMF'S application to renew its operating licence.

During the licensing period, CNSC staff verify regulatory compliance via a range of different activities. These include desk-top reviews of a variety of reports prepared and submitted by TRIUMF, such as, annual compliance reports, incident reports, safety committee meeting minutes, and of course TRIUMF'S responses to any issues identified during regulatory compliance inspections.

Fourteen (14) such inspections were conducted during the licensing period. These inspections included both general compliance assessments and focused inspections related to specific aspects of TRIUMF's operation.

The specific areas examined included quality assurance, the training program, radiation protection, environmental protection, emergency response, fire protection, security, and the packaging and transporting of nuclear substances.

As mentioned previously, there were some outstanding issues related to the fire safety and

implementation of TRIUMF's quality assurance program which were identified during the previous licence renewal hearing.

During the licensing period, significant progress was made by TRIUMF in the implementation of its quality assurance program. All of the action items identified previously were addressed to the satisfaction of CNSC staff. Staff have continued to monitor these issues and to ensure TRIUMF continues to meet and obtain and improve its quality assurance program.

Although one new action notice related to this program was identified during the most recent inspection, in December 2011, this issue involves only a single element of the overall quality assurance program at TRIUMF, and is not representative of any general shortcoming or any systematic breakdown of the program. TRIUMF has submitted an action plan for addressing this issue, which is acceptable to staff.

With respect to fire protection, all of the requirements of the licence conditions added in 2007 have been satisfied.

A fire hazard analysis has been performed for the facility, and an acceptable fire protection plan is in place. Third party reviews are submitted for any proposed site modifications with a potential to impact on

fire protection. Periodic third party reviews of the inspection, testing, maintenance of site fire safety systems are being performed as required.

With regards to the many other programs examined during the inspections over the licensing period, there are currently no outstanding action items or concerns relating to radiation protection, environmental protection, emergency response, or the packaging and transport of nuclear substances.

TRIUMF is in the process of improving and enhancing the overall implementation of its systematic approach to training for all working groups across the site. There are now two outstanding actions items from inspections conducted in 2011 relating to these long-term improvements. Both are proceeding satisfactorily in accordance with the action plan submitted by TRIUMF.

There are also three other procedural or documentation updates related to facilities at TRIUMF which are currently pending, all of which are largely administrative in nature.

The Commission will note from the Commission Member Document that waste management received a below expectations grade in 2011. As noted in the CMD, this related primarily to housekeeping types of issues associated with the consolidation and disposal of waste

materials contaminated with very low levels of radioactive material. This waste primarily consists of personal protective clothing, such as gloves, shoe covers, and disposable gowns.

The below expectations grade does not in any way represent a significant risk to the health and safety of persons or the environment. Rather, it reflects the observation of a temporary failure to adhere to best practices such as the timely transfer of materials to designated storage locations.

There were several factors contributing to this deficiency, all of which have been satisfactorily addressed. This includes a procedural update which is indicated in the CMD as still having been open. The revised procedure has now been submitted, has been reviewed by CNSC staff, and was acceptable.

A focused inspection of TRIUMF’s radioactive waste management program is planned for the upcoming fiscal year.

Radiation dose monitoring for staff working at TRIUMF is performed using commercial dosimeters provided by a licensed dosimetry service. These are read quarterly and doses are reported to the National Dose Registry.

Both nuclear energy workers and non-nuclear

energy worker staff are required to wear dosimeters within the fenced perimeter of the site. In addition, all staff accessing active areas, within the site, are also required to wear direct-reading dosimeters which give and immediate indication of any radiation dose incurred.

TRIUMF has a comprehensive system of administrative controls for flagging unusual doses and initiating dose investigations. The administrative controls trigger an internal investigation of the dose by TRIUMF.

TRIUMF also has action levels, which, if exceeded, require mandatory reporting to the CNSC. During the licensing period, no action levels were exceeded.

TRIUMF nuclear energy worker radiation doses are presented on this slide. The maximum worker dose in any year is typically around 8 millisieverts which is well below the annual regulatory dose limit of 50 millisieverts. It is also below TRIUMF’s action level of 15 millisieverts, and below TRIUMF’s administrative control level of 10 millisieverts.

It should also be noted that only a very small number of TRIUMF staff received doses of about 5 millisieverts in any given year. These are personnel performing specialized tasks in the most highly-active areas. The average number of energy -- of the average

nuclear energy worker dose, was one millisievert per year over the five-year licensing period.

Extremity dosimeters are also provided for nuclear energy workers who handle radio isotopes or activated components. Over the five-year licensing period, the maximum extremity dose to any individual was 74.1 millisieverts, and the average extremity dose was 5.1 millisieverts for these workers, well below the extremity dose limit of 500 millisieverts.

TRIUMF's existing administrative control level for extremity doses is shown, but TRIUMF is currently reviewing its policies related to administrative control levels and action levels for extremity doses. It is expected that the control level will be significantly reduced in the near future and that an action level will be established.

Operationally, extremity doses are reviewed monthly and any unusually high doses are already being investigated regardless of whether or not the control level has been exceeded.

This slide summarizes some of the other key areas of regulatory interest. Airborne emissions from TRIUMF are dominated by very, very short-lived activation products associated with the normal operation of the main Synchrotron.

The total combined airborne -- annual airborne releases from TRIUMNF have consistently remained at levels which will result in a maximum general public annual -- excuse me -- which would result in a maximum annual dose to a member of the general public of less than .01 millisieverts per year which is 1 percent of the general public dose limit. The results obtained from TRIUMF's environmental monitoring system confirm that doses from atmospheric releases are at or below this level.

Typically, liquid effluent releases into the sewer from TRIUMF's active sumps have consistently remained at levels which will result in a maximum dose of less than one one-millionth of the general public dose limit.

The financial guarantee for decommissioning of TRIUMF, which was accepted by the Commission in 2007, remains valid and in effect, and has been updated to reflect 2011 costs.

The preliminary decommissioning plan for TRIUMF is currently being updated to incorporate the planned new ARIEL accelerator facility. Once this has been completed, it will be assessed by CNSC staff, including its potential impact on the requirements for the financial guarantee.

At the present time, there is no plan to decommission TRIUMF at any point in the foreseeable future.

An environmental determination was performed pursuant to TRIUMF's application to renew its operating licence, and the determination indicated that an environment assessment was not required.

So, finally, the next two slides are summaries of TRIUMF'S overall regulatory compliance in all safety and control areas. Performance in the seven safety and control areas, shown here, is satisfactory as indicated by the SA rating. In all cases, the overall compliance trend is either stable or satisfactory level or is improving.

Similarly, with the exception of the waste management, the remaining six safety and controlled areas shown here are also satisfactory with either a stable or improving compliance trend.

As discussed at some length earlier in this presentation the below expectation rate for waste management relates to 2011 only and all corrective actions have now been completed. Current performance in that area is satisfactory.

Based on these compliance observations and staff assessment of the program documentation submitted by

clients in its application to renew the operating licence, staff have come to the following conclusions.

First, the licence renewal application meets CNSC's regulatory requirements. All areas of concerns identified during the previous licence renewal hearing of 2007 have been satisfactorily addressed by TRIUMF. TRIUMF conduct licence activities safely and in accordance with CNSC requirements.

In general TRIUMF's staffs are very knowledgeable, have consistently been responsive to any issues of concern raised by CNSC staff and are qualified to conduct the activities authorized under the proposed licence.

Consequently, staff recommend renewal of TRIUMF operating licence for the requested period of 10 years. Staff will report to the Commission regarding the ongoing regulatory performance of TRIUMF via the Directorate of Nuclear Substance Regulations Annual Industry Report.

It is further recommended that the renewed licence be issued in a new Class I facility licence format using the redefined safety and control areas and including a new licence condition handbook which has been developed taking into account unique nature of TRIUMF's facilities and operations.

This concludes the presentation. Thank you for your attention.

THE CHAIRMAN: Thank you.

Let me start the question session with Miss Velshi.

MEMBER VELSHI: Thank you Mr. Chairman.

Question for TRIUMF. How many similar facilities as yours exist in the world? And how does its performance compare to theirs particularly with regards to safety?

DR. LOCKYER: There are three facilities in Europe. There are rapidly becoming one facility in the United States which is a new facility that's being built by the Department of Energy. Europe is building a new facility in Germany also plus those that I've mentioned. And then Korea, China, India are all building facilities now like TRIUMF. And then there's TRIUMF.

I would say we certainly rank in the top few in the world; I'm not going to say the best because that would get me into trouble with my colleagues but right up there I would say.

MEMBER VELSHI: Thank you.

So again, question for TRIUMF. In your CMD 12-H5 on page 22 on worker dose control, in 2008, the maximum individual dose to a non-nuclear energy worker was

reported at .94 millisieverts, very close to the one millisieverts annual dose limit, so what controls failed and what led to that and what has happened since to address any issues?

MS. TRUDEL: Anne Trudel, Manager of Environmental Health and Safety, for the record.

There's in fact an error in our report with regard to that dose and it's related to the fact that we have -- in putting that report together, we were looking to use the Landauer doses, whereas what we used for managing our dose on a daily basis are the direct reading dosimeter results and in using the Landauer doses to put that report together, I used a list for nuclear energy workers which was in fact not for the current year.

So this particular individual with .94 millisieverts of dose was in fact a nuclear energy worker in 2008, his status as a nuclear energy worker expired part way through 2009 and so, in fact, that dose is not a non-nuclear energy worker dose.

The corrective report would show a maximum for the non-nuclear energy worker dose of 0.6 millisieverts.

MEMBER VELSHI: So, is there a reason why the CMD did not show the correct dose for non-nuclear energy workers?

MS. TRUDEL: It was in doing this analysis with the Landauer doses; it was being done essential for the CMD. So the error was appreciated after the CMD went in.

MEMBER VELSHI: So in 2008, your reporting would have shown a non-nuclear energy worker getting a dose pretty close to the dose limit but that didn't trigger any alarm bells, it's only when you preparing the CMD that you suddenly said "Oh, we'd better have a closer look at this?"

MS. TRUDEL: As I said, the dosimeters that we use for managing our dose are the direct reading dosimeters, so in fact on the direct reading dosimeter, this person showed up as a nuclear-energy worker because he was correctly a nuclear-energy worker but that wasn't reflected in the list that I was using in doing the analysis.

MEMBER VELSHI: Okay.

Again for TRIUMF, on this whole area of waste management and it being rated as below expectations and yes you know by now it's satisfactory but the CNSC has identified in their CMD on page 31 that they had raised issues numerous times to the licensee around waste management.

So a question really for the licensee and

you know we're happy to have the Board Committee Chair here, is this something that the Board Committee would have seen that the CNSC has shown concerns repeatedly and what took so long before they were addressed?

MR. THOMPSON: I'm trying to recall what we saw. It was certainly, was this part of the quality assurance issues that we were sort of focussing on in the 2010-11 area?

I think Anne Trudel might be able to address this more completely.

MS. TRUDEL: For the record, Anne Trudel.

This would have been an action notice from a compliance inspection visit. Rob Thompson is relatively new as the Chair of the Board Safety and Security Committee. His predecessor David Venus (phon.) from McMaster would have reviewed essentially the action notices as they're presented at our Safety Management meeting quarterly.

And in terms of our programs and the delays of the repeated findings, they deal with essentially our janitorial support staff for our radiation areas and we have had a higher turnover in terms of that personnel in that group that has led to some of the delays.

But we now have procedures in place to address the janitorial support that's required for those

radiation areas. That should mean that even with staff turnovers, we're better protected to ensure that the requirements are being addressed.

MEMBER VELSHI: Thank you. Again for TRIUMF on your environmental monitoring aspect; on page 22 of the CMD, you report that you're updating your derived release limits document to comply with the CSA standards and you also mention that the dose that's measured, as a result of your emission, is two to three times lower than what the derived release limit would enforce the dose to be; so as you're updating the document is there a likelihood that your DRLs would actually be lowered?

MS. TRUDEL: That is a possibility in terms of looking at the reasons why our environmental monitoring is giving us results that are factors of 2-3 lower. It's become clear that one of the aspects of that, likely most impacts that results it would account for that reduction comes about because of our -- the weather data that's used in our derived release limit modelling. And in the past we've used weather data from the airport, Vancouver Airport, which is about a few kilometres away, but it's in a different -- we're up on a bluff relative to the airport that's at sea level.

We've since -- in the last two years, we've had weather station data at TRIUMF. And in looking at

that weather station data, it's clear that essentially the meteorological data is such that the frequency distribution for the wind pattern means that we have a lower frequency blowing in the direction of our nearest population.

And so that would mean, in fact, that our derived release limits would not drop, but would increase.

Thank you.

MEMBER VELSHI: Thank you.

Now, I think I heard in the presentation that this issue may already be addressed, but I'll ask. It's on -- it's a question for the CNSC staff. In the licensee's CMD, one of the requests they have is this requirement to have a second consultant to complete a third party review of the fire hazard analysis.

Is this an NFPA requirement, and what is your comment on TRIUMF's request?

MR. RÉGIMBALD: I'll ask Mr. Jeff Sandeman to answer the question.

MR. SANDEMAN: It was largely a misinterpretation on what was expected. We've had the fire protection staff, myself meet with staff from TRIUMF to get a clarification.

The requirement is to have a third party review of the design of fire safety systems during

modification. It was being misinterpreted to imply that the third party review had to be done of the fire hazard analysis every time, and it has been resolved satisfactorily.

I would ask if -- I don't know if fire protection has anything to add to that.

MR. BUNAGI: Zach Bunagi, for the record.

I think the issue it was like miss -- they misunderstood the requirement of -- that was set in the licensing condition handbook because the purpose for that requirement is more for the review for the design requirement, not for the fire hazard assessment.

MEMBER VELSHI: Thank you.

And is TRIUMF happy with this clarification?

MS. TRUDEL: Yes, we are. And we're, in fact, just getting under way with our third party review for the ARIEL facility for the design and will be looking to submit that to CNSC staff in the next two to three weeks.

MEMBER VELSHI: Thank you, Mr. President. I'll come back to any remaining questions I have later.

THE CHAIRMAN: Thank you.

Monsieur Harvey?

MEMBER HARVEY: Merci, monsieur le

président.

First question has to do with the training, and it appears in both documents. There was four action notices are considered as long term tasks. Could you explain that? What means "long term" and the nature of those tasks?

MR. RÉGIMBALD: I would ask a representative from the Training Program Evaluation Division to provide a response, please.

MR. VESELY: Martin Vesely; I'm a senior Training Program Evaluation Officer.

The nature of the long term tasks are to apply the standardized systematic approach to training to all the work groups on site, try and fit a significant amount of work in implementing a systematic approach to training. But due to the dynamic nature of the facility, some of them had either become out of date or were in need of a revamp, and clearly this isn't something that is done over the course of a few days or a few weeks.

So if I was to characterize the action notices, they pertain to updating and maintaining the training program.

MEMBER HARVEY: So when do you think those actions will be closed?

MR. VESELY: Martin Vesely.

As per the corrective action plan that was submitted by TRIUMF and the one that CNSC staff approved, the date that's associated with the closure of these items is by the end of 2012. CNSC staff continue to monitor the progress and are satisfied to date.

MEMBER HARVEY: So those dates, then, they'll be completed -- my question is addressed to TRIUMF. They'll be completed next December?

MS. TRUDEL: Anne Trudel.

I think I will ask Phil Jones, our Manager of Training, to respond to that.

MR. JONES: Phil Jones, for the record. I'm the Manager of Quality Assurance and Training at TRIUMF.

Yeah, we're currently on track to meet those deadlines. We recently released five revised training plans for different groups at TRIUMF, and we're working towards releasing the rest of the training plans by the end of the year.

MEMBER HARVEY: How many employees are touched by the training?

MR. JONES: TRIUMF has 350 full-time employees, but we have a large number of students, visiting scientists, contractors which are also affected by our training programs.

The training plans that we're creating currently, though, deal with employee training.

MEMBER HARVEY: Just employees; not contractors?

MR. JONES: We have other training programs that contractors are taking, our basic site safety orientation, so all of the visiting contractors will take that training.

MEMBER HARVEY: Okay. Thank you.

MR. SANDEMAN: Sorry, I just wish to offer a point of clarification.

When the CMD was written, there were four outstanding action notices. Two have since been closed and one closure is imminent. I expect it to be closed next week. There is, in fact -- by the end of this month there will only be one outstanding action item.

MEMBER HARVEY: Very good.

On page 22 of your TRIUMF written submission about the site-wide evacuation drills, you mentioned that there has been two such exercise during the -- since 2007. When was the last one?

MS. TRUDEL: Anne Trudel, for the record.

The last one would have been two years ago in May or June. We're planning one -- we have one scheduled for June 6th of this year.

MEMBER HARVEY: Of this year?

MS. TRUDEL: Yes.

MEMBER HARVEY: So, the staff, are you satisfied with that frequency?

MR. RÉGIMBALD: I would like to ask a representative from the Emergency Management Program Division to provide a response, please.

MR. ST. MICHAEL: Hello. Peter St. Michael here from Emergency Management Programs Division.

Yes, staff are satisfied and we are planning to perform an inspection at the site evacuation drill on June 6th of this year.

MEMBER HARVEY: Thank you.

THE CHAIRMAN: Can I jump in? Here is where I ask the post-Fukushima question of all facilities.

Just remind us again what you have done post-Fukushima to deal with the beyond design basis, either it's hazard, earthquake, any doomsday scenarios, and what would you have done to mitigate them.

MR. SANDEMAN: Jeff Sandeman, for the record.

The Commission did issue a GN12 request for information, to which TRIUMF responded. The nature of the hazards at TRIUMF because it isn't a reactor and because there's no possibility of meltdown or anything like that

are such that any natural disaster, first of all, is already part of their emergency plan.

The worst-case release scenarios have already been analyzed and there are no additional mitigation measures necessary or warranted because that type of release associated with Fukushima simply isn’t possible with an accelerator. It doesn’t work that way.

THE CHAIRMAN: I want to hear it from TRIUMF first.

Secondly, did you do things like earthquake while the thing is in operation, any other kind of subsidiary systems, et cetera, that can cause some beyond design as I like to call it, "very low probability, high-impact events."

DR. LOCKYER: Yes. So we have gone through sort of the simulated disaster scenario, so, you know, my main concern is I know what I have to do. So if something happened like an earthquake then the person in charge of the operating control room takes charge of the facility.

They make a phone call to me to let me know that that something has happened of significance, and then there's a whole series of procedures that take place. But basically we know that we have a control centre in the lab where the relevant people go to.

If there's need for calling the fire

department that happens, if there's need for first aid those people are there.

So I think we're in a pretty good situation to handle an emergency whether it's a fire that comes about from the earthquake or whether it's personal injury or anything like that.

So we are in an earthquake zone, we know that, so that is something that I am concerned about. The standard things we can say are that we're not concerned about the accelerators themselves, they will just -- once we lose power the accelerators turn off.

So it's really personal safety that I'm concerned about, and I think we're in good shape for that.

I think Anne has a couple of things she'd like to add.

MS. TRUDEL: I think the only comment I would add to Nigel's comments is that in terms of carrying out our safety analysis for the next abridged licence amendment which was for acting on target -- current upgrade.

We went through, as a result of your requests from the Fukushima fallout we went through a careful analysis of potential escape routes for these gaseous radioactive effluent from our vacuum system and put in place additional monitoring for those systems, to

ensure that we -- and alarms as well in terms of evacuating the area, should we lose containment of those gases.

Thank you.

THE CHAIRMAN: I see Mr. Jammal came to the podium.

MR. JAMMAL: Thank you, Mr. President. It's Ramzi Jammal for the record.

I'd just like to explain to you the process that the directive went out to TRIUMF and CLS, under Mr. Régimbald requesting a safety assessment as it pertains to the early lessons learned at Fukushima and the long-term aspect.

As it was mentioned the safety case order was reviewed and there are no immediate short-term actions that the licensee must put in place.

So the codes with respect to the building design, the fire protection inspections, the emergency management programs are adequate for magnitude of earthquakes or combined event as such. So those short-term actions are not required.

On the long-term basis, as Mr. St. Michael has indicated, as part of the regulatory and normal regulatory oversight of the CNSC, we'll be conducting inspections in order to address the integrated form of the

emergency management program, which will include evacuation or changes of the pipes and so on and so forth.

Or a rattling of the pipes, if I may say, caused by any event, let it be an external event or combined external event.

So the intent here is do they have proper mitigation measures in place? The answer is, yes. Do they have proper short-term actions that will address any potential events? The answer is, yes.

And as we go on with the regulatory oversight and any enhancement that's required will be done and will be put in place as part of the routine regulatory oversight.

So in conclusion even if the containment is lost, we're talking of radio isotope substances of physical half-life of seconds or minutes or even hours. So by the time any dissipation takes place the environmental impact is minimal or nonexistent.

THE CHAIRMAN: Thank you. Mr. Harvey?

MEMBER HARVEY: Yes. My other question is addressed to the staff, it's on slide 15 of your presentation; it's about the inspections.

I just want to have some information about -- I see that general compliance you've got two inspections per year, and then I've got at the bottom of

the page packaging and transport. The last inspection and the only inspection done was in December 2011, so right at the end of the period.

So are you looking at those different items during your general compliance inspection, because if it's not the case, it is to say that the packaging and transport has been looked at only at the end of the period?

MR. REGIMBALD: We conduct two kinds of inspections, one are called Type 1 inspection, which is an audit type of inspection that targets specific areas that we want to look at. And the Type 2 inspection is a more general sort of just performance verification of programs.

I'll let Mr. Sandeman provide some details, but my understanding is that we conduct at least two general compliance per year inspections, and targeted inspections, depending on the outcomes of these general compliance inspections or from reports that we get from licensees or other findings.

So if Jeff could add details, please.

MR. SANDEMAN: I have little to add. Certainly when we do a general compliance inspection we're looking at all aspects of compliance. Looking for anything that would lead to a flag where we need to focus, or have a more focused look at it.

In this case there were no actual triggers that led to the need of a transport inspection other than it was due. There were no flags that anything had been wrong in the past, and I would ask perhaps staff from the transport licensing and strategic support division can give the details of that inspection, if you wish.

MEMBER HARVEY: Not necessary. What is the required time to do a specific inspection, Type 2 inspection, or Type 1?

MR. SANDEMAN: Jeff Sandeman for the record.

MEMBER HARVEY: If that's okay.

MR. SANDEMAN: Inspections typically last onsite anywhere from two to four days depending on the nature of the inspection, how many staff are involved. And often when we have what I would say multiple inspections being conducted simultaneously in different areas.

So for instance in December there was follow-up being done relating to a training program, and specifically, previous action items, there was general compliance, there was security and there was transport packaging all happening on different elements of the site with different staff.

MEMBER HARVEY: Turn to TRIUMF, how do you

live with that, do you think there is too many inspections, or not enough inspections or --

MS. TRUDELL: Anne Trudel for the record. The multiple inspections happening at the same time I think, you know, our staff is sufficiently broad. As I said we have 15 people in environment, health and safety, and then with our implementation panels for the QMS core and for the training program means essentially that we can have two or three people with any aspect of the inspection via training or packaging and transport.

As for the number of inspections I think two is sufficient.

DR. LOCKYER: I'd like to make a comment too. So as you probably know TRIUMF is sitting in a emerging neighbourhood and so we have a couple thousand residents at the end of the street now. When I came to TRIUMF five years ago it was trees.

So we are very interested in maintaining an excellent relationship with those people, and the more inspections and the more help we get in ensuring that we are safe for that type of neighbourhood I feel better about it.

MEMBER HARVEY: Last question. Don't mean the last question. That's on page 33 of the Staff's CMD. Anyway, it's about the IAEA inspections. Does the Staff -

- is advised when the IAEA visit facility?

MR. RÉGIMBALD: I would ask somebody -- a representative from the Safeguards Division to provide some details.

MS. OWEN-WHITRED: For the record my name is Karen Owen-Whitred, the Director of the International Safeguards Division.

Yes, we do get advanced notice from the IAEA when they are to conduct an inspection at a Canadian facility.

MEMBER HARVEY: And I see that the staff was not present when the IAEA was there. So is it always like this or do you sometimes accompany the -- such a visit?

MS. OWEN-WHITRED: Karen Owen-Whitred.

Yes, CNSC staff makes all efforts to attend all IAEA inspections to the extent possible. We do have to apply somewhat of a risk-based approach to that given just available resources.

In the cases where we cannot attend, perhaps due to distance or available personnel, what we typically do is begin with a phone call with the licensee and with the IAEA inspectors engaged in the inspection to ensure everybody is aware of what's going to take place.

We will occasionally finish the day with a

follow-up phone call of everyone involved to make sure that everything went satisfactorily during the day as well.

MEMBER HARVEY: And you always receive the result from IAEA inspection? Is it systematic you've got the result anyway even if you're not there?

MS. OWEN-WHITRED: Correct. As part of our safeguards agreement with the IAEA, they have a requirement to provide to us in writing the results of any inspection that they carry out in Canada.

MEMBER HARVEY: Okay. Merci.

THE CHAIRMAN: So how often do they do the inspection of TRIUMF and the SLCI, for example?

MS. OWEN-WHITRED: With regards to safeguards, TRIUMF is -- of those two facilities that you mentioned only TRIUMF is a safeguarded facility.

The IAEA has recently moved towards a more randomized approach to the way that they conduct inspections across Canada based on an analysis of the risk involved. In TRIUMF's case, it's considered very low risk for safeguards, so the application of inspections is actually, on average, once every five to seven years.

THE CHAIRMAN: Thank you.

Dr. Barriault, please.

MEMBER BARRIAULT: Merci, monsieur le

président.

To TRIUMF, on your Slide 17, individual training plan, and you have WHIMIS and you have radiation protection and safety orientation, there's nothing mentioned about fall protection and yet, on your Slide 20, you mention that you have a fall protection plan and training.

MS. TRUDEL: Anne Trudel, for the record.

If you, in fact, look at the excerpt of the individual training plan that's below, this is -- so fall protection would be captured in our conventional safety at the top.

MEMBER BARRIAULT: Okay. So ---

MS. TRUDEL: And if you look at that individual training plan, you can see that we have fall arrest. I think it's ---

MEMBER BARRIAULT: Yes, that's correct, fall arrest.

MS. TRUDEL: Yeah. So that's the second one.

MEMBER BARRIAULT: That's a different plan, is it, the fall arrest?

MS. TRUDEL: No, fall arrest, fall protection, it's all the one.

MEMBER BARRIAULT: But it's not checked off

in your ---

MS. TRUDEL: No, this -- this here is an excerpt, sorry. This I took as an excerpt of an individual training plan and I cut out the person's name and the supervisor, so for this particular individual, this is the training that was required.

MEMBER BARRIAULT: Okay. And also, I noticed that he had -- didn't have any fire extinguisher training. Is that part of the training individually for the people working?

MS. TRUDEL: The fire extinguisher training is provided to a facility staff, but it isn't captured here in our individual training plan. Perhaps something that we could look at adding but we certainly do carry it out.

MEMBER BARRIAULT: Okay. So it's an editorial comment then rather than a training comment.

Thank you.

That's all, Mr. Chair. Thank you.

THE CHAIRMAN: Mr. Tolgyesi?

MEMBER TOLGYESI: Merci, monsieur le président.

First, I think it's a typo error when you are saying that you have 11 full members and six associated members, whereas on page 8 you are talking

about 11 and four. I suppose it's supposed to be six.

Page 11 -- page 8 -- I'm sorry. Page 8 at your TRIUMF report, governments, there is saying at the third paragraph -- first paragraph, third line from the bottom is four associate members. It's supposed to be six, I suppose.

DR. LOCKYER: It is six.

MEMBER TOLGYESI: Okay.

When you are talking about ---

THE CHAIRPERSON: Sorry. So this is an excuse for me to try to find out this understanding what is an associate and what's a full member, what's the difference.

And I must tell you, at the same time, I tried to really understand this organizational chart that only lawyers would like, and I'm sure you got two lawyers here. Anybody who can put 17 universities together to work together is a major achievement, so I'm not slighting it. All I'm trying to understand is what the benefit of being a full member rather than an associate.

MR. THOMPSON: Rob Thompson, for the record.

So the 11 full member universities are literally the owners of TRIUMF. They are all co-signatories on all of the relevant documents in terms of

all of the processes around TRIUMF.

They are the people that are -- that are primarily responsible -- well, they are the ones that make up the Board of TIA -- sorry, TAI.

The associate members are typically either the smaller schools that have a smaller participation in TRIUMF and are -- just don't have the resources to become full members of the consortium or -- and Calgary's a good example of this -- they are the more recent -- the institutions that have become more recently involved in TRIUMF and it's sort of a stepping stone towards consideration of full membership.

So we are not voting members of the Board, we are not members of the TAI Board, but we are very much involved in the oversight of the management.

THE CHAIRMAN: But is there any financial -- I mean, do you provide funding, the financial guarantees associated with those members, whether the university at large?

MR. THOMPSON: So the -- none of -- the operations of TRIUMF are funded basically directly by the government through the -- through NRC. In terms of financial responsibilities of the full members, that's only associated with effectively underwriting any shortfalls that happen to come about when and if the

decommissioning plan is ever undertaken, and the associate members have no responsibility with respect to that.

THE CHAIRMAN: Okay, thank you.

Monsieur Tolgyesi?

MEMBER TOLGYESI: Merci.

I was just looking also at the organizational chart. You know, in -- you were talking -- it's something missing there or what is that advisory -- private sector advisory committee? It's mentioned in -- on a page, I don't remember which one, but it's not in the chart.

And the other one is that I expect that the executive committee should be who is executing things. That means probably because it sits as one of committees reporting to the Board.

DR. LOCKYER: That's right. So -- Nigel Lockyer.

The executive committee is -- consists of five and is going to six members from the main board. Because TRIUMF has grown so much in the last few years, we've found that the board meetings have become unwieldy. There's too many people in the room.

So we've gone to a format of two board meetings per year and then between those we have the executive committee meets, and then the executive

committee then reports back to the full board. So the chair of the executive committee is the Chair of the Board, Paul Young, from -- Vice-President of Research from the University of Toronto.

And then we have -- you know, there's sort of a fixed membership. It's the chair of the personnel committee and so on.

Yeah, I think that's what you're asking.

And then what was your other question?

MEMBER TOLGYESI: So that's what -- I expected that executive committee will be between the board and the director --

DR. LOCKYER: Yes.

MEMBER TOLGYESI: -- you know, because it's a kind of -- it's a small board.

DR. LOCKYER: It's a small ---

MEMBER TOLGYESI: I mean, five times a year or six times a year. That's why I expect it there because when I look at the organizational chart, I didn't know what executive committee is doing.

DR. LOCKYER: Right.

MEMBER TOLGYESI: I mean, what's the responsibilities.

DR. LOCKYER: In fact, we meet this afternoon. We have a meeting in Toronto this afternoon.

So the other thing you mentioned about the private sector advisory committee.

MEMBER TOLGYESI: Yeah, it's not there.

DR. LOCKYER: Correct. So that's a committee that reports to myself. It's -- you might call it an ad hoc committee that I put together of what I would call well-established business people to give advice on our commercialization issues. And probably should be on this chart.

MEMBER TOLGYESI: Yeah.

DR. LOCKYER: It is on the chart there, PSAC, sorry, yeah.

MEMBER TOLGYESI: Guarantees; you are talking about 9.9 million for initial phase of decommissioning. What it means “initial phase”?

DR. LOCKYER: Okay, so there’s two phases; the first phase is if TRIUMF receives notice from the Government of Canada that our funding it will be -- will be no longer, then we go into a sort of a shutdown mode of the laboratory, we secure the facility for safety to the people and the environment.

We then go through and we -- the assumption here is it’s going to be a greenfield site when it’s finished so that the UBC farm will expand across the street and they’ll be growing vegetables, where TRIUMF is

now, and to do that we'll have to raise the buildings.

And so it's the initial buildings that are easy to be raised that are part of that 9.9 million.

And phase two, you might imagine, is the rest of the facility at a later date, once the radioactivity has decayed in the various machines in areas and so on.

MEMBER TOLGYESI: And further on the same page you are talking about the balance of decommissioning activities will be funded by the growth -- via proceeds from the sales of assets. That means you sell assets at the end, I suppose, and funds will serve, which means if it's not sold it's not decommissioning or how it will work?

DR. LOCKYER: Well, there's a couple of aspects to that.

So some of the assets we can sell are, for example, my house that I live in, so that's pretty easy to sell and in Vancouver that brings in a lot of money initially.

So the plan is to sell those things at the beginning which you notice an increase in funds right at the -- in addition to our escrow account, that take us up by about $5 million. And so that's more than adequate for us to go through that phase one.

Then there's a much later sale of assets that come -- you know, you might imagine the steel from the cyclotron would be sold and so on. So it's really those -- the easy ones first and then everything else you can sell afterward.

THE CHAIRMAN: Yes, I think we're going to hear from staff how you assess this plan because Dr. Lockyer's house may be worth a lot of money now but after the bubble, in 100 years from now it may not be, in fact somebody have to be paid to take it off his hands.

A little bit more seriously, how did -- is staff agreed with the financial preliminary kind of decommissioning funding and how one might get to the 44 million, eventually?

MR. RÉGIMBALD: I'll ask the representative from the Waste and Decommissioning Division to respond.

THE CHAIRMAN: Go ahead, please.

MS. OUE: Shirley Oue with the Waste and Decommissioning Division, for the record.

Currently TRIUMF's financial guarantee is composed of three components; the financial security excess agreement, the fund contribution gap agreement and the escrow agreement.

The full amount is $44.2 million as was presented earlier in the presentations.

In terms of the amount -- the amount that's provided, currently it's $10.1 million as of March 31st, 2012 -- 2011, sorry.

I'm sorry; could you repeat the question?

THE CHAIRMAN: How you going to get from 10 -- who is going to guarantee the rest and why is it acceptable if we deem it to be 44 right now, how do you go from 10 to 44?

DR. LOCKYER: Perhaps it would be better if we got our CFO to answer that question.

THE CHAIRMAN: Anybody, but I want to hear also from staff, who presumably accepted this plan.

MR. CHEN: Good afternoon; Henry Chen, Treasurer TRIUMF Accelerators Inc., for the record.

The financial guarantees include the three agreements that we have, the financial security and access agreement, the gap agreement and also an escrow agent agreement we have with RBC.

We currently have, as of March 31st, 2012, $10.2 million in our decommissioning fund. It is managed by RBC and exit of those funds out of the account requires the express written approval by CNSC.

The first phase of decommissioning costs $9.9 million in 2011 dollars. We have money set aside to fund that.

Subsequent to the initial phase there will be a disposition of assets in an orderly manner. There will be two phases as Dr. Lockyer had mentioned earlier; the more liquidable assets will be -- will be sold off within a year and then there will be an orderly disposition of the rest of the assets onsite over the next two years.

The next phase of decommissioning will happen 20 years after the original shutdown. So there will be many years where the value from the disposed assets will grow in our escrow account, compounded by the interest gains over the years.

The second exit of the funds would then deplete those funds down and the assets will continue to grow from the balance of the decommissioning plan.

THE CHAIRMAN: CNSC?

MS. OUE: Shirley Oue.

CNSC staff does not expect the sale of assets to cover the financial guarantee.

It’s stated here in a part of our review that there’s moneys put aside for safe storage with surveillance, for monitoring and the growth of this fund will be sufficient for the decommissioning of the facility.

THE CHAIRMAN: Go ahead.

MR. HOWARD: Don Howard, for the record.

What I'd like to add here is, is that the fund that is currently in place will cover the -- to put it in a safe state of storage when the end of life does happen or whenever that occurs.

Now, what happens is that over time, until the facility reaches the end of life, the financial guarantee fund will grow over time. So at the end of the day if it costs $44.2 million to decommission TRIUMF and there is a shortfall between the growth of the fund and whatever the final decommissioning number is, is that CNSC staff has been informed that there is a fund contribution gap agreement that the -- I guess the other universities who will form part of this TRIUMF will then supplement the funding to ensure the full cost for decommissioning is there.

THE CHAIRMAN: Well that's what I was looking for, for a final guarantee should none of the proceeds of disposal materialize.

And have you seen these agreements and we -- didn't CNSC staff have to approve this agreement?

MR. RÉGIMBALD: Yes, I understand the agreements were approved in 2007.

THE CHAIRMAN: Okay.

Mr. Tolgyesi?

MEMBER TOLGYESI: So that means this contribution to full decommissioning cost is a privilege of be a full member. Am I right?

THE CHAIRMAN: With the full member comes obligations. That's what I understand.

DR. LOCKYER: That's correct. That's a privilege.

THE CHAIRMAN: It's always true.

MEMBER TOLGYESI: What's -- you have a licence -- you have a lease agreement with University of Alberta for 99 years.

DR. LOCKYER: University of British Columbia.

MEMBER TOLGYESI: I'm sorry.

DR. LOCKYER: That's correct, 99 years.

MEMBER TOLGYESI: University of British Columbia for 99 years. What's expected life of your facility? You could draw on for next hundred years or further or it's 25 years?

DR. LOCKYER: I think the -- it goes in stages of knowledge, but I would guess that TRIUMF has a horizon of another 40 years, at the moment, based on our projected projects and what we're planning to do. It's hard to project longer than that but I'm sure the next round of people will come up with things that they want to

do as well.

So from our standpoint now the investments that the Government of Canada is putting into TRIUMF will -- for full efficiency and getting your money's worth will take about 40 years is my guess.

MEMBER TOLGYESI: And my understanding is when I add these numbers that you said it's the first of three phases. First will be two to three years removing the buildings, after 20 years and after 45 years.

So I should -- when I add altogether it's about 68 years, am I right, to fully decommission?

MS. TRUDEL: The 45 years is 45 years from the start of decommissioning.

MEMBER TOLGYESI: Okay.

MS. TRUDEL: So it's additional --

MEMBER TOLGYESI: Okay, it's 45 years.

MS. TRUDEL: -- 25 after the 20.

MEMBER TOLGYESI: Okay. My next one is going back a little bit to the training. You said there was three area of training safety orientation, the radiation and conventional safety training.

Those are three areas, but how many models you have within these three areas? I don't know 15, 20 or 5 models, specific models for training?

MS. TRUDEL: Anne Trudel for the record.

Just to be clear when I refer to three areas for training I was referring to the three separate areas on the chart.

So site safety orientation, radiation and conventional safety I lump together into one. And then operator training, and then the third one was job-specific training.

Perhaps your question then is with regard to the training programs for radiation and conventional safety training, and that's what's captured in our individual training plan which is below on the slide.

And so I think perhaps I can pass the question to our manager for training and he can be more specific as to the number of training programs and perhaps also how they're delivered.

MR. JONES: Yeah, we have a number of different training programs so the basic safety orientation obviously is taken by anyone who access to the site.

The radiation protection course obviously is required training for nuclear energy workers. Under Occupational Health and Safety we have electrical safety, fire extinguisher training, WHIMIS, laser safety, you know, a number of different programs.

MEMBER TOLGYESI: And is these training programs or just the radiation protection program which

has a expiration date, because you are saying that in 2008 you implemented a five-year expiration period for all staff? Is it also for visitors, for anybody who takes those courses?

MR. JONES: Yes. For the radiation protection anyone with training within the last five years is considered to be a valid nuclear energy worker.

If they have training from another facility we will have them run through our refresher training which is able to be completed within a half day just to verify that they still have knowledge that's appropriate for our facility.

MEMBER TOLGYESI: And it may be the last one. If I can in page 23 of your report you are talking about -- I'm talking about waste management. And you are saying that high level waste I suppose is higher radiation level waste?

MS. TRUDEL: Yes, that's our production target referring back to the CNSC's slides with regard to how an accelerator works.

The proton beam or the accelerated beam bombards the target, that's typically about 50 grams of material, and the activity of the target are quite high levels.

Typically with our production facilities we

generate about ten radiated targets of waste annually, and the activity per target is about two or three curies. So, that it's in that context that we say high level.

MEMBER TOLGYESI: And you are saying that they are stored to allow the decay on the facility for two to three years, and after is a shipment, two such shipments a year? So what's the volume of those shipments; where do you ship them?

MS. TRUDEL: Anne Trudel for the record. The spent targets are -- a spent target, the 50 grams of material and the associated hardware, the cooling and the ion source take up about a 50 gallon pail-size and they go in a shielded flask and they're shipped to Atomic Energy of Canada Limited.

Their IRUS, intrusion resistance underground storage, so there would be ten of those containers shipped annually.

MEMBER TOLGYESI: What do you mean by "formal public participation in the laboratory," what's that? They are visiting, or they participate in something? It's in the staff report page 38.

DR. LOCKYER: All right. I guess I can answer that question. So we are, as I told you, we are living in a increasingly populated area, and so we are considering having a -- yes, we're considering having a

third party organization that will, I would say poll or canvas a community to try and understand their concerns about living in the neighbourhood.

You could imagine we do it ourselves, but we don't want to influence the outcome in any way, and so then we would get a better sense of how the neighbours respond to us, and then we would act on those recommendations. So that's something we've -- we're planning to do probably in the next couple of years. So the growth of the community is going from about 2,000 to 10,000 people in the next several years.

MEMBER TOLGYESI: So there will be a third party or consultant or somebody who will be hired to do this communication?

DR. LOCKYER: That's correct. So we would have to sit down with them and decide, you know, what questions they would be asking, but then they would go into the community and say, all right just down the street from your house is a nuclear facility. Does this give you concern? What are your concerns?

There's a school maybe a kilometre or so from TRIUMF, a kilometre and a half from TRIUMF that will be beginning probably in the next couple years, high school.

And so all of these things are of concern

to us, that everybody's comfortable with TRIUMF, so that's why we have the tours, that's why we have lectures, that's why we -- we actually go into the community and make presentations. We go to this board meeting for example. So I would say thus far we have an excellent relationship with our community.

THE CHAIRMAN: All right. Just on that point I think the level of ignorance out there, but physics and nuclear is breathtaking. So anything you can do to hit that little bit of knowledge that would be really I think useful.

Anybody else, any other questions?

I've got a couple of quick hits. First of all I'm curious you mentioned the neutrino measurement in Japan. How did they fix it? I thought the whole Japan moved, what did they do to the beam?

DR. LOCKYER: There are pictures available of the damaged facility. So the J-PARC facility sits right on the ocean. I forget the exact height, but they had a Tsunami barrier that was I'm going to say 18 metres.

So there was a small amount of water in the facility but not a large amount, but the earthquake shifted the land up to a couple of metres in places, so roads were completely destroyed, various elements were knocked over. But in fact the beam lines themselves were

undamaged, and so that aspect of things was, you know, came back very quickly.

So the real issue was there's a shortage of power in Japan and so a facility like this uses a lot of power, and so it took time for them to get permission to run the facility again. But, you know, they're back and running.

THE CHAIRMAN: So they're running it without any nuclear power running now in Japan?

DR. LOCKYER: I'm not sure where their power comes from, but they're running it ---

THE CHAIRMAN: Coal and gas?

DR. LOCKYER: --- and, you know, the facility itself is minimizing the power they use for the more mundane things like lights and heating and so on in order to get their science back on the road, because it's a very competitive field.

THE CHAIRMAN: Thank you. I'm just also intrigued about the district heat. Is the university going to pay you for this?

DR. LOCKYER: That's our hope in the long run, but it is a university and they're bigger than we are. So what we see is that in order to actually construct it so we are adjusting our sites so that there’s a single point at which all the hot water can be

collected.

And then there would have to be some connection between TRIUMF that would we have to be transported up the street to the campus. So the university would pay for that. The estimate I heard was $18 million for that, they would pay for it.

Then the agreement would be once they've made sufficient savings over the years that -- you know, cancel their capital investment then they are willing to sit down and have a discussion with us about making some money.

So, let's say 20 years from now there will be a meeting to see if we can make some money from it.

But it really goes back to wanting to be part of the community and the initial concerns that came from the community is that the water would be radioactive and we assured them that it's closed system of water we use within TRIUMF.

Even then there was concerns that it would -- even with a heat exchanger there would be radioactivity transferred into the water, so we had further discussions on that point. I think they're largely satisfied now that this would just be warm water.

And, you know, the fact that they can be part of a community that's viewed as sustainable and that

they’re getting their heat from waste heat is a good thing for us.

And I think the University of British Columbia views this as a very high priority in terms of their, you know, they’re ranked, in North America, as one of the top 10 facilities in terms of their sustainability programs so it’s important to them too.

THE CHAIRMAN: Thank you.

What about a quick update on the isotope production. How close are you to -- you already proved the concept I thought, but what about the commercial, and in terms of determining the volume?

I’m trying to understand whether eventually all those new technology will be able to replace the production from NRU.

DR. LOCKYER: Sure. So what we’ve -- our program is to produce Technetium 99M directly on a small medical cyclotron.

So Canada has a network of cyclotrons, most major cities have one or two of these cyclotrons; so Vancouver has one at the B.C. Cancer Agency, Edmonton has a couple at the Cross Cancer Agency et cetera, et cetera, cross the country.

Those machines are primarily used, as you might guess for PET isotopes and so they’re used during

the day and they sit idle during the evening.

So what we've developed is a target that is made of Molly 100 that can be put in the form of a solid that can replace the existing targets for the pad isotopes and you would run the machine overnight.

And for a typical -- I'll call it TRIUMF design TR series TR19 let's say, which is the smaller machine, you should be able to produce enough for the City of Vancouver in one six-hour run.

So that's our -- that's our -- you know we've submitted our reports or our final report went in a day or two ago and we have submitted a provisional patent on the technique for producing these targets.

And we're in a number of -- I'll say -- multi-institutional non-disclosure agreements with Canadian companies on how this is going to be commercialized. So we're looking both nationally and internationally for that.

THE CHAIRMAN: Will you require a different licence from us or is it part of the -- maybe to staff, both, if you go into commercial?

DR. LOCKYER: Well, for TRIUMF we will not be producing Technetium 99 commercially, that's not our plan.

So we will move on to the next challenge, I

think that's why we're there. So it'll have to be a licence request from somebody else, commercial partner.

THE CHAIRMAN: Staff?

MS. MURTHY: Yes. Cyclotrons are using the technology that TRIUMF pioneered, are already in place in a number of institutions.

Primarily you may have heard about Sherbrooke demonstrating visibility of the approach and the targets system that has been developed at TRIUMF has been implemented I believe in TRIUMF and it's being tested in a number of places.

These are Class II nuclear facilities, they have been licenced and they're operating under a Class II nuclear facility licence at this time.

THE CHAIRMAN: So what's new about this technology? I mean I know it existed before so what's -- what's kind of a new technology here, aside from putting a new target I guess?

DR. LOCKYER: To make it very simple, the target -- making the target itself, the material and put it in a target holder that can be cooled and handled is the technology.

So Molly is well known to be a substance that's hard to handle, so it's a powder. So the question is how do you plate that, how do you put it on a surface,

how do you cool that, and then how do you deal with it afterwards once it's been irradiated.

So it's those steps which are what TRIUMF has a lot of expertise in and that's where we've requested the provisional patent.

MS. MURTHY: From a regulatory point of view from what the CNSC does, the major issues that we are dealing with with respect to the target is how the target will be handled, how it will be removed from the irradiation station and the end of the beam to a station that it can be processed safely and handled safely by workers.

THE CHAIRMAN: Thank you.

Last question; I understand that you're looking for the 10 years licence for visibility, support. I assume you're not expecting that all of a sudden CNSC will disappear for 10 years.

I know you're going to miss our five-year meeting in front of the Tribunal but the whole licensing scheme has changed to something that we call Licence Condition Handbook where the same kind of inspection and frequency of inspection will continue and they will present it annually to us.

So I'm just trying to make sure that there's an understanding that the same level of scrutiny

if a 10-year licence is granted will continue.

DR. LOCKYER: Yes, we understanding that.

THE CHAIRMAN: I just want to make sure. Anybody -- anything else?

DR. LOCKYER: If I can finish the isotope question you asked. So you asked does it replace the NRU.

So what -- the model that we see is that if you own a cyclotron, if you're a hospital or a facility in a major metropolitan area, you'll be able to provide Technetium 99 directly to that region.

If you're talking about the north or you're talking about other remote areas it may be advisable to use a generator because then you wouldn't be shipping the Tech directly.

So the technician has a six-hour half-life so it goes quite a way but -- so we can see a mixed model in the future.

And I think also the -- what's attractive to the health agencies is that it will stabilize the supply. So if you have a cyclotron in Vancouver that's capable of providing all of the necessary tech for that region and you're getting generators from say Coviden or Lantheus, and one of those goes down for whatever reason because one of the reactors, either in Canada or elsewhere has gone offline, you'll have a backup.

So the diversity of the supply is going to be increased no matter what happens with the NRU and I think that's a very attractive thing to the health agencies, that's what they've told them.

THE CHAIRMAN: Okay. Thank you. Thank you very much.

Marc?

MR. LEBLANC: Yes.

So this concludes the hearing. The Commission has determined there's no need to have an in camera session on security matters.

So the Commission will now confer with regards to the information that is considered today and then determine if further information is needed or the Commission is ready to proceed with a decision.

We will advise accordingly.

Mr. President, should we resume the meeting at 14:00, 2 o'clock?

THE CHAIRMAN: Yes.

MR. LEBLANC: So we'll be back for the meeting at two o'clock.

Thank you.

THE CHAIRMAN: Two o'clock.

Thank you.

--- Upon adjourning at 1:19 p.m./

L’audience est ajournée à 13h19