

1 **HEARING DAY 2**

2 **TRIUMF: Application for a licence to operate**
3 **Class I and Class II particle accelerator**
4 **facilities at its site in Vancouver, British**
5 **Columbia**

6 We will now move to Item 3 of the
7 agenda which is Hearing Day 2 on the matter of the
8 application by TRIUMF for an application for a
9 licence to operate Class I and Class II particle
10 accelerator facilities.

11 The first day of the public
12 hearing on this application was held December 13,
13 2001. The public was invited to participate,
14 either by oral presentation or written submission
15 on Hearing Day 2.

16 January 29th was the deadline set
17 for filing by intervenors. No requests for
18 interventions were filed.

19 A notice of Public Hearing
20 2001-H19 was published on October 8, 2001. The
21 Commission Members present for Day One of the
22 Hearing included Mr. Graham, Dr. Giroux,
23 Ms MacLachlan and myself.

24 As in Day 1 of the hearing,
25 Dr. Barnes has excused himself from participating

1 in this hearing in relation to this application.
2 Dr. Barnes is on the faculty of the University of
3 Victoria and the University is one of the
4 participants in the joint venture.

5 Presentations were made on Day One
6 by Commission staff under CMD 01-H34 and CMD
7 01-H34.A. I note that both the applicant and CMD
8 staff will present supplementary information
9 today.

10 I would like to begin by calling
11 on the TRIUMF group for their oral presentation as
12 outlined in CMD document 01-H34.1.

13 I note that there is a number of
14 TRIUMF representatives with us today. I believe
15 Dr. McDonald will start.

16 Good morning.

17

18 **01-H34.1/01-H34-1A**

19 **Oral presentation by TRIUMF**

20 DR. SHOTTER: Madam Chairman,
21 Members of the Commission. May I introduce the
22 delegation from TRIUMF?

23 John McDonald is the Chairman of
24 the Board of Management of TRIUMF.

25 Feridun Hamdullajhpur is Chairman

1 of the Safety Commission -- sorry, Chairman of the
2 Safety Committee of the Management Board, and Lutz
3 Moritz is the Management Officer of the Health and
4 Safety Committee of TRIUMF, and I am the Director
5 of TRIUMF itself.

6 The presentation will be made
7 by Lutz Moritz.

8 MR. MORITZ: At the December 13th,
9 2001 meeting of the Canadian Nuclear Safety
10 Commission, the TRIUMF application for a renewal
11 of its operating licence received its first public
12 hearing.

13 At that hearing CNSC staff
14 presented a summary of their findings related to
15 the TRIUMF application. These findings were
16 largely positive, showing that TRIUMF was in
17 compliance with all existing licence conditions.

18 However, at that meeting the
19 Commissioners were sufficiently concerned about a
20 number of issues to request that TRIUMF make a
21 presentation at the second public hearing today.

22 So this presentation will try to
23 address the issues of concern raised at that first
24 hearing.

25 First of all, we would like to

1 offer a brief introduction of TRIUMF.

2 TRIUMF is Canada's National
3 Laboratory for Particle and Nuclear Physics.
4 Under the NRC Contribution Agreement, TRIUMF has
5 responsibility for supporting the accelerated
6 radioactive ion beams program and the base program
7 on 500 MeV cyclotron, as well as providing
8 infrastructure support for the Canadian Subatomic
9 Science Community and contributions to
10 international accelerator projects.

11 TRIUMF has also been highly
12 successful in its effort to pursue applications of
13 the technology developed at TRIUMF.

14 The accelerator facility located
15 on the campus of the University of British
16 Columbia is based on a cyclotron that accelerates
17 negative hydrogen ions to a peak energy of 520
18 MeV. TRIUMF also operates two radioisotope
19 production cyclotrons: a 42 MeV cyclotron and a
20 30 MeV cyclotron for MDS Nordion.

21 A fourth cyclotron with a maximum
22 proton energy of 13 MeV is operated by the TRIUMF
23 Life Sciences program in collaboration with the
24 University of British Columbia Health Sciences
25 Centre and is used for the production of

1 radioisotopes for positron emission tomography.

2 The ISAC facility at TRIUMF uses a
3 linear accelerator system to accelerate
4 radioactive ion beams to energy is up to 1.6 MeV
5 per atomic mass unit.

6 The programs and TRIUMF support
7 the activities of some 500 users drawn from the
8 international scientific community.

9 TRIUMF also provides
10 infrastructure support for particle physics
11 experiments in Canada and in a number of
12 accelerated facilities around the world.

13 The acceleration of negative
14 hydrogen ions in the 500 MeV cyclotron shown at
15 the centre of this slide, make possible the
16 extraction of multiple proton beams of variable
17 energy.

18 These proton beams may be directed
19 towards five distinct areas that differ in the way
20 the proton beam is utilized: The Meson Hall for
21 the production of pi-meson and muon beams; the
22 Proton Hall for nucleon-nucleon scattering
23 experiments; ISAC for the production of
24 radioactive ion beams; the Proton Therapy Facility
25 for treatment of intra-ocular tumours; the Proton

1 Irradiation Facility for material radiation damage
2 studies, and the 2C Irradiation Facility for the
3 production of radioisotopes for medicine.

4 In this plan view of TRIUMF also
5 shown are the 42 MeV radioisotopes cyclotron and
6 the 30 MeV cyclotron and the 13 MeV cyclotron.

7 We will now describe some aspects
8 of the organizational structure of TRIUMF.

9 TRIUMF is operated as a joint
10 venture of five universities: the University of
11 Alberta, the University of British Columbia,
12 Carleton University, Simon Fraser University and
13 the University of Victoria. Six other
14 universities have associate status in the
15 consortium: The University of Manitoba, McMaster
16 University, l'Université de Montréal, Queen's
17 University, the University of Regina, and the
18 University of Toronto.

19 The TRIUMF Board of Management is
20 appointed by the member universities to operate,
21 supervise and control TRIUMF. The Board's primary
22 duties include policy making and determination of
23 the budget, facilities planning and funding for
24 the laboratory.

25 One member of the Board is

1 designated to monitor safety issues at TRIUMF.
2 The TRIUMF Board selects the Director and appoints
3 the members of the Operating Committee on the
4 advice of the Director.

5 For operational purposes, TRIUMF
6 has been organized into a number of functional
7 divisions whose heads are responsible to the
8 Director. The divisions are further subdivided
9 into groups which have responsibility for various
10 systems and operations.

11 Experiments are assigned priority
12 by the Experimental Evaluation Committee and they
13 are scheduled by the Associate Director who also
14 heads the Science Division. The Director receives
15 administrative support from the staff of the
16 Administration Division and the role of the Safety
17 Management Committee that interacts with the
18 Director we will discuss in the next slide.

19 At TRIUMF safety is recognized to
20 be a line responsibility. Each Line Supervisor is
21 directly responsible for the safety of those under
22 him.

23 Ultimate responsibility for the
24 safety requirements in the design, construction,
25 and operation of facilities within the laboratory

1 rests with the Director. The Director delegates
2 this responsibility to the heads of the various
3 line organizations, and through them to the
4 supervisors.

5 Supervisors are held directly
6 accountable through line authority to the Director
7 for the safety of their operation.

8 Safety issues are addressed at the
9 quarterly meetings of the TRIUMF Safety Management
10 Committee. This committee is composed of the
11 heads of the TRIUMF divisions, the Chair of the
12 TRIUMF Accident Prevention Committee, the Manager
13 of the Office of Environmental Health and Safety
14 and the heads of the three operations groups and
15 is chaired by the Director of TRIUMF.

16 The members with operational and
17 safety oversight responsibilities provide reports
18 of the safety status of the facility at these
19 meetings, and the Director assigns any outstanding
20 issues to the responsible division head for
21 resolution.

22 The Board of Management monitors
23 the safety status of TRIUMF through its
24 Environmental Safety and Security Committee.

25 We will now describe in more

1 detail the arrangement that exist between the
2 universities that govern TRIUMF.

3 In January 1966, the University of
4 British Columbia supplied the initial tract of
5 land on which TRIUMF is located in order to build
6 a cyclotron accelerator facility for research
7 purposes.

8 At that time there were three
9 participating universities hence the name
10 Tri-University Meson Facility, or TRIUMF: The
11 University of British Columbia, Simon Fraser
12 University and the University of Victoria. In
13 1968 the University of Alberta became the fourth
14 member of the TRIUMF consortium.

15 The question of an appropriate
16 organizational structure was an issue of serious
17 consideration from the outset. In the period from
18 March 1975 to November 1981, various models
19 including incorporation and the joint venture
20 model were extensively explored. The joint
21 venture model was eventually formally adopted on
22 November 3, 1981.

23 When the Joint Venture Agreement
24 was amended as of March 2000 to include Carleton
25 University as a full member, the joint venture

1 model was found to be still appropriate.

2 Under the Joint Venture Agreement
3 each participating university owns an equal,
4 undivided interest in all assets, including
5 intellectual property, and has an equal
6 responsibility for liabilities.

7 The Director of TRIUMF arranges
8 for adequate and proper insurance protection
9 against all property loss and against liabilities.
10 The policies protect the Governors of the
11 participating universities in the joint venture
12 and all appointees acting on behalf of TRIUMF.

13 The Director presents the
14 insurance program of TRIUMF and any
15 recommendations for changes to that program to the
16 Board at least once per year.

17 The agreement specifies that at
18 any time during the life of TRIUMF any of the
19 universities may withdraw from TRIUMF on one
20 year's notice. The agreement would then be
21 changed and modified when necessary to reflect the
22 reduced number of universities participating in
23 TRIUMF.

24 The university that has withdrawn
25 will not be responsible for any liabilities that

1 rise out of activities of TRIUMF after the expiry
2 of the notice of withdrawal, but will remain
3 liable in respect of any liability that may arise
4 out of activities of TRIUMF prior to the notice of
5 withdrawal. The remaining universities will be
6 equally responsible for any liabilities incurred
7 after the date of notice of withdrawal.

8 The University of British Columbia
9 would retain right in the land and buildings used
10 by TRIUMF in the event of their withdrawal.

11 In the event of the termination of
12 TRIUMF, no further business would be transacted
13 except such as might be necessary for the winding
14 up of TRIUMF affairs and distribution of assets.
15 The Board would continue to serve until the
16 completion of the winding up of TRIUMF.

17 In the event of the termination of
18 TRIUMF, the affairs of TRIUMF would be wound up
19 and liquidated as promptly as business
20 circumstances and orderly business practices
21 permit.

22 Under the agreement, each of the
23 participating universities agrees that it shall
24 work with the University of British Columbia and
25 the other universities to address any

1 environmental issues that may arise out of the
2 termination of TRIUMF.

3 We would now like to say a few
4 words and make some comments on the relative
5 magnitude of the hazard posed by the TRIUMF
6 operation.

7 The hazards associated with the
8 operation of TRIUMF are for the most part similar
9 to those encountered in the operation of other
10 light industries. Among these hazards, the use of
11 high-voltage and high-current electrical devices
12 and overhead materials hoists are probably the
13 most significant.

14 The radiological hazards of TRIUMF
15 consist of the prompt radiation due to interaction
16 of the accelerated protons with matter and of the
17 induced radioactivity generated by these
18 interactions. Both of these are proportional to
19 the power in the accelerated beams of particles.

20 This slide shows how TRIUMF fits
21 into the regulatory structure of the Nuclear
22 Facilities Regulation. The TRIUMF 500 MeV
23 facility is designated as a nuclear facility
24 Class IB. The regulations that govern nuclear
25 facilities Class IA which apply to power reactors

1 and nuclear facilities Class IB, which among
2 others apply to accelerators with energy greater
3 than 50 MeV have most elements in common and these
4 have common requirements.

5 The one difference in the
6 regulation is the requirement for certification of
7 certain personnel for Class IA facilities.

8 As we saw in a previous slide, the
9 total radioactivity induced in a proton
10 accelerator, that is all the radioactivity induced
11 in the structure and in any targets or beam dumps
12 is approximately proportional to the power in the
13 accelerated beams.

14 The proportionality may be
15 expressed as approximately six terabecquerels at
16 saturation per kilowatt of beam power. Although
17 this represents an overestimate by perhaps a
18 factor of two for accelerators with proton
19 energies less than a few hundred MeV.

20 The power average over the long
21 term in the proton beams produced at the TRIUMF
22 500 MeV cyclotron is less than 100 kilowatts and
23 thus the total radioactivity induced in the
24 facility is of the order of 600 terabecquerels.

25 In comparison the radioactivity

1 inventory of a typical power reactor is
2 approximately 50 terabecquerels per kilowatt. A
3 typical 1000 megawatt power reactor therefore has
4 a radioactivity inventory of 50 million
5 terabecquerels about a 100,000 times greater than
6 TRIUMF. The radioactivity produced by the 500 MeV
7 cyclotron is almost entirely induced in solid
8 structures and hence is non-volatile and cannot be
9 accidentally released to the environment.

10 Let us now turn to specific issues
11 that were raised at the first hearing. These
12 included comments on the safety culture at TRIUMF
13 and questions on operator training, quality
14 assurance, decommissioning and housekeeping. I'm
15 getting ahead of myself here a little bit.

16 So safety culture at TRIUMF was
17 independently evaluated last year by a team of
18 consultants commissioned by the CNSC. The
19 evaluation was generally very positive as
20 exemplified by the following quotations taken from
21 the summary of the report submitted to the CNSC by
22 the consultant.

23 "Employees interviewed and
24 surveyed across the TRIUMF
25 facility described the

1 organization as a safe place
2 to work and one that places a
3 high priority on environment,
4 safety and health issues.
5 Employees perceive the
6 organization to pay attention
7 to the values, attitudes and
8 behaviours important to safe
9 performance.
10 Management places a high
11 level of emphasis on
12 environment, safety and
13 health issues.
14 Employees are generally aware
15 of these issues."

16 The positive safety culture is
17 also illustrated in this figure taken from the
18 report which summarizes the responses to questions
19 concerning safety awareness of staff and how they
20 perceive the hazard both on site and the potential
21 impact off site. The vertical scale on this graph
22 is the rating given in response with a possible
23 range from one to seven.

24 The first two points summarize the
25 responses on perceived risks with seven

1 corresponding to the highest level of perceived
2 risk. The low rating on these points shows that
3 TRIUMF staff recognize and understand that both
4 the hazard of working at TRIUMF and the possible
5 off site impact are low. They correctly reflect
6 that the ISAC facility has perhaps the greatest
7 potential for hazard as it produces some volatile
8 radioactive material.

9 The second two points summarize
10 the answer to the question concerning how TRIUMF
11 staff perceives management emphasis on safety or
12 risk management and the level of awareness by
13 employees of the safety issues. A high score here
14 indicates a high level of emphasis and a high
15 level of awareness. The score showed that the
16 awareness of safety issues by both management and
17 employees across all divisions at TRIUMF is at the
18 same high level despite the recognition that the
19 risks are low. The highest emphasis and awareness
20 is also correctly put on the ISAC facility where
21 the risk is perceived as being greatest.

22 Now, we turn to the question of
23 operator training. After the introduction of the
24 NSC regulations, CNSC staff examined the TRIUMF
25 operator training program and found it to be

1 generally acceptable, except that it was not as
2 well documented as they thought desirable.

3 CNSC staff requested at the time
4 to follow a systematic approach to training.
5 Since then, TRIUMF has submitted a training plan
6 to the CNSC and has invested considerable effort
7 and made significant progress in formalizing the
8 operator training program using this approach.
9 TRIUMF recognizes the need for continued
10 improvements and is committed to making its
11 training program more transparent to outside
12 scrutiny.

13 In fact, the training of the crews
14 involved in operating the accelerators has always
15 been a high priority at TRIUMF. In the past,
16 operators were trained primarily by job shadowing
17 that lasted approximately six months. The
18 trainees joined a number of different shifts to
19 obtain a balanced view and to learn procedures
20 relevant to round-the-clock operation. Shifts
21 dedicated specifically to operator training are
22 regularly scheduled. During more than 25 years of
23 operation, there have been no incidents due to
24 operator error that resulted in radiation
25 exposures greater than a small fraction of the

1 TRIUMF administrative control level or that had
2 any measurable radiological off site impact.

3 That this training has been highly
4 effective is also demonstrated by the fact that
5 the availability of the accelerators is
6 consistently greater than 90 per cent, a very high
7 figure when compared to other accelerator
8 laboratories.

9 A training plan for the
10 accelerator operators has set March 31st 2002 for
11 a completion date for the analysis phase. This
12 phase is ahead of schedule and we expect to meet
13 the milestone. The design of the training program
14 has started and a completion date for this phase
15 has been set as May 1st 2002. Once the design has
16 been completed so that the resource requirements
17 are better to find, milestones will be set for the
18 development and implementation of the program.

19 Another issue that has been raised
20 is the question of quality assurance. TRIUMF is
21 highly committed to quality in all aspects of the
22 operation. The quality of the scientific output
23 as judged by the international physics community
24 has consistently been at the highest level. We
25 have described the details of how TRIUMF achieves

1 quality in the design and operation of its
2 facility in our submission for a licence renewal.

3 In this connection we might
4 mention the report of the NRC Peer Review
5 Committee, which in 1999 reported that:

6 "By its high world-wide
7 visibility, TRIUMF is perhaps
8 the major scientific facility
9 that materializes Canada's
10 status as one of the advanced
11 G-7 countries on the
12 scientific scene."

13 The requirement for a quality
14 assurance program is new under the NSC
15 regulations. TRIUMF has formed a task force to
16 address the question of better defining the
17 quality assurance program at the laboratory.
18 TRIUMF is committed to complying with the
19 regulations and finding ways to improve the
20 quality of all aspects of the operation.

21 Next we turn to the issue of
22 decommissioning. TRIUMF management is aware that
23 as a responsible organization it must plan for the
24 eventual decommissioning of all or parts of the
25 laboratory. In order to develop a defensible plan

1 and cost estimates, TRIUMF has therefore
2 commissioned an independent consultant to develop
3 such a plan. An amount of \$225,000 has been
4 budgeted for the work currently under way, which
5 is expected to be completed by mid-2002 and to be
6 submitted to the CNSC by September 2002.

7 Based on the estimates from this
8 study, Industry Canada will be asked to supply a
9 letter of guarantee to CNSC. In the interim,
10 TRIUMF has a copy of a letter from the President
11 of NRC, Dr. Carty, dated April 2nd 1996, sent to
12 the President of the University of British
13 Columbia stating that:

14 "In the event that
15 decommissioning becomes
16 necessary, NRC agrees to use
17 its best efforts to bring
18 this issue to the attention
19 of the federal government for
20 resolution."

21 The liability for decommissioning TRIUMF would
22 rest with the universities if there was no funding
23 from the federal government.

24 CNSC staff in their report brought
25 up the issue of housekeeping. At TRIUMF we work

1 diligently to maintain an acceptable standard of
2 housekeeping. It must be said that the
3 housekeeping issues at a dynamic research
4 facilities where the installation is in constant
5 flux are more complex than at a facility dedicated
6 to producing a fixed product.

7 The TRIUMF Accident Prevention
8 Committee inspects this site on a monthly basis
9 and issues deficiency notices to supervisors who
10 do not comply with the expected standard. These
11 deficiencies are most often quickly resolved but
12 are also reviewed at the quarterly safety
13 management meetings. Any unresolved issues
14 require prompt attention -- require prompt action,
15 I should say, by the responsible division heads.

16 We remain committed to continuous
17 improvement in all matters affecting safety. A
18 new housekeeping task force has recently been
19 given oversight responsibility for assuring that
20 all housekeeping matters are promptly addressed.

21 A measure of the effectiveness of
22 the TRIUMF occupational health and safety program
23 is the rate classification applied by -- to
24 TRIUMF, rather, by the Workers' Compensation Board
25 of British Columbia. Despite the presence of

1 significantly greater hazards than on the typical
2 university campus in British Columbia, TRIUMF's
3 premium rate classification has been reduced from
4 that applied to light industries, to that applied
5 to other universities in British Columbia. But
6 because of a history of low claims, TRIUMF has its
7 premium rate further discounted by more than
8 14 per cent from the base rate for universities.

9 I would like to now summarize by
10 indicating that TRIUMF management and staff place
11 a high priority on environment health and safety
12 issues and are continually seeking to improve the
13 standard of safety. TRIUMF is actively pursuing
14 compliance with the latest regulatory requirements
15 as they apply to training, quality assurance and
16 decommissioning.

17 The ultimate measure of success of
18 the safety program as far as concerns radiological
19 safety is the dose to the workers at TRIUMF.
20 TRIUMF has been able to reduce the dose to workers
21 while at the same time increasing both the number
22 of accelerators on site and their output. This is
23 demonstrated in the following graph.

24 In this graph the total power in
25 all the particle beams of the accelerators at

1 TRIUMF is plotted as a function of time.
2 Superimposed is the collective dose for TRIUMF
3 workers also as a function of time. During the
4 initial learning curve, the collective dose
5 increased as the power in the accelerator beams
6 was increased.

7 Much development aimed
8 specifically at reducing the dose to personnel
9 that maintain and service the accelerators after
10 high intensity operation was carried out over a
11 short period resulting in both enhanced
12 reliability of the cyclotrons and an improvement
13 of the handling of radioactive components. These
14 developments have been applied to the design of
15 new cyclotrons installed at TRIUMF and elsewhere.

16 As a result, there has been a
17 steady decline of the annual collective dose to
18 TRIUMF personnel. At the same time, several new
19 facilities have been installed and production has
20 continued to increase.

21 That concludes our presentation,
22 Madam President.

23 THE CHAIRPERSON: Thank you very
24 much.

25 With the permission of the

1 Commission members I would like to turn to the
2 CNSC staff for their presentation before we open
3 the floor to questions. In that regard I would
4 like to turn to CNSC staff, specifically as
5 outlined in CMD Document 01-H34.B and I will turn
6 to Mr. Howden who is Acting Director General of
7 Nuclear Cycle and Facilities Regulation.

8 Mr. Howden.

9

10 **01-H34.B**

11 **Oral presentation by CNSC staff**

12 MR. HOWDEN: Madam Chair, members
13 of the Commission, for the record my name is
14 Barclay Howden. I'm the Acting Director General
15 of the Directorate of Nuclear Cycle and Facilities
16 Regulation. With me today are Dr. Aly Aly,
17 Director of the Research and Production Facilities
18 Division and Mr. John Power, Head of the New
19 Projects Licensing Section within the same
20 division.

21 At Day One of this hearing on
22 December 13th 2001, CNSC staff presented CMD's
23 01-H34 and 01-H34.A to the Commission. Since then
24 CNSC staff has submitted a supplementary CMD
25 01-H3.B that provides additional information in

1 response to Commission member questions raised on
2 Day One.

3 With regard to training, TRIUMF
4 has submitted a revised action plan that CNSC
5 staff finds to provide an adequate basis for
6 developing the needed training program using a
7 systematic approach to training. CNSC staff finds
8 the program to be ambitious and will be monitoring
9 the implementation progress closely.

10 For this issue and others, if the
11 proposed licence is issued by the Commission, CNSC
12 staff proposes to update the Commission on the
13 licensee's performance in one year's time. This
14 update would be in addition to another status
15 report later in the licence term that would be
16 done to comply with the CNSC staff's new approach
17 to flexible licence terms that has just been
18 finalized.

19 For the joint venture agreement,
20 CNSC staff is satisfied that the current
21 organizational structure and arrangements for
22 management control and accountability in relation
23 to the operation of the TRIUMF facilities are
24 acceptable for the purposes of the Nuclear Safety
25 and Control Act.

1 The CNSC staff conclusions and
2 recommendations remain unchanged. That is, the
3 licensee's operating performance has been
4 acceptable during the current licence period. The
5 licensee's application for a new licence meets the
6 requirements of the Nuclear Safety and Control Act
7 and its regulations, with the exception of the
8 quality assurance program and preliminary
9 decommissioning plan for which there are two
10 licence conditions proposed. And the applicant is
11 qualified to carry on the activity that the
12 licence will authorize and will, in carrying on
13 that activity, make adequate provision for the
14 protection of the environment, the health and
15 safety of persons and the maintenance of national
16 security and measures required to implement
17 international obligations to which Canada has
18 agreed.

19 The CNSC staff recommends that the
20 Commission revoke TRIUMF's current licences and
21 issue a consolidated Class IB particle accelerator
22 operating licence for a five year term.

23 CNSC staff is prepared to answer
24 any questions you may have.

25 THE CHAIRPERSON: Thank you,

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1 Mr. Howden.

2 The floor is now open for
3 questions from the Commission members.

4 Mr. Graham.

5 MEMBER GRAHAM: Thank you.

6 This morning we have, I guess,
7 received quite a few assurances and some definite
8 time lines and my question first, I believe, would
9 be to CNSC staff.

10 In H-34.B you have said that there
11 will be a reporting on performance in one year by
12 March 31st 2003. If this licence had been a
13 five-year licence given a couple of years ago,
14 would you have been able to flag these problems
15 the same way and see the need for reporting within
16 one year like you are committing to this morning?

17 I guess what I am trying to ask is
18 on December 13th the Commission well raised, I
19 think, some fairly serious questions. Those
20 questions this morning have been addressed to a
21 certain extent. There will be questions on them
22 again but my concern is that if those -- if there
23 had not been an appearance before the Commission
24 at that time, would we have been able to be on top
25 of the situation like we are today?

1 MR. HOWDEN: Dr. Aly will respond
2 to that question.

3 DR. ALY: In our current approach
4 we have plans to provide updates to the Commission
5 on performance of all Class I and Class II
6 facilities. We did that last year for all
7 radioisotope processing facilities. It was in the
8 late fall and we plan to continue doing that for
9 the rest of the facilities. There will be
10 periodic reporting on licensee's performance.

11 MEMBER GRAHAM: But my question,
12 and that is still kind of not answering it the way
13 I understand it.

14 If TRIUMF hadn't been before us,
15 if they had not been before us on December 13th,
16 would you have still been aware of all of the
17 serious situations that -- if there hadn't been an
18 application, would you have been aware of the
19 seriousness of some of the questions that were
20 approached on that December 13th hearing?

21 DR. ALY: The answer to that is
22 yes because we have already activities in progress
23 regarding all the issues. We are communicating
24 with the licensee on that and there are programs
25 in place. And this we are going to proceed with

1 or without a hearing.

2 What I mentioned before is we were
3 going to report to the Commission periodically on
4 all licensee performance. But yes, the answer is
5 yes.

6 MEMBER GRAHAM: Because the
7 applicant has come, you know, with some pretty
8 specific deadlines for certain things and I'm
9 wondering if those specific deadlines, and I
10 believe one of them is October 2002 and one is
11 November 2002 this year, that they will address
12 these issues. Would they have been given those
13 same deadlines?

14 DR. ALY: The answer to that is
15 yes also.

16 MEMBER GRAHAM: Okay. Thank you.

17 THE CHAIRPERSON: Dr. Giroux.

18 MEMBER GIROUX: Thank you.

19 I would like to address questions
20 first to the applicant.

21 Concerning the training and the
22 operators, I would like to have a perspective of
23 numbers here. How many operators do you have in
24 total and how many new ones do you have per year?
25 Is there a high turnover rate or not and what is

1 the training requirement?

2 MR. MORITZ: There are three
3 different operating crews at TRIUMF. One to run
4 the 500 MeV cyclotron. There are five shifts of
5 three operators on that crew. There is another
6 crew for to operate the ISAC accelerators, which
7 is not always operating around-the-clock these
8 days yet because it's still under development. So
9 I think there are about ten operators there. And
10 then there are the radioisotope production
11 cyclotron operators. I believe there are another
12 10 to 12 operators in that crew.

13 And the turnover rate in the past
14 has been very low. There are typically one or two
15 operators a year that are replaced.

16 MEMBER GIROUX: When you have new
17 operators, where do they come from? Do they come
18 directly from outside or do they move up through
19 the ranks?

20 MR. MORITZ: Well, the initial
21 operators, I mean initially most of the operators
22 were drawn from the technical people that had
23 helped to build the facility. But the newer ones
24 have come mostly as graduates from the -- out of
25 one of the technical colleges in British Columbia.

1 We have had also people coming
2 with experience from say the nuclear fuel cycle
3 people from -- reactor operators and so on. But
4 very, very few.

5 MEMBER GIROUX: What you called in
6 your presentation, I believe, "shadowing training"
7 or something. Does that apply to new operators?

8 MR. MORITZ: Yes.

9 MEMBER GIROUX: And your training
10 plan, which you have proposed and that staff has
11 seen, does it focus mainly on the current
12 operators in terms of updating their abilities or
13 does it focus on new operators or what does it
14 focus on?

15 MR. MORITZ: Well, it is a general
16 plan that would apply to all operators and we
17 would plan to basically requalify the operators
18 and also it would apply to any new operators that
19 were being hired.

20 MEMBER GIROUX: My last question
21 on this, more out of curiosity.

22 How many hours per week on average
23 would you expect your operators to spend on
24 training?

25 MR. MORITZ: I don't know how to

1 answer that really.

2 DR. SHOTTER: Can I just actually
3 say, I mean if an operator is actually on the job
4 it is essentially the whole day, because there is
5 obviously a continual dialogue between the senior
6 operators and the more junior people. So this is
7 indeed what one means by job shadowing, so that
8 there is dialogue the whole day. So in a sense
9 when a new operator comes in, the whole day is
10 actually spent in the training mode. That is what
11 obviously job shadowing is.

12 I think that is an extremely good
13 way of actually learning how to operate a system
14 that is actually sort of fairly complex. I think
15 that the record that the facility is actually sort
16 of running 90 per cent of the time -- and that is
17 an extremely high value in my experience in other
18 accelerators around the world, in fact 90 per cent
19 is actually very high.

20 I think that does actually reflect
21 the quality of the training the operators have
22 actually sort of gone through and I think the
23 shadowing is an extremely effective way of
24 undertaking a training process.

25 MEMBER GIROUX: Thank you.

1 I will shift to a different line.
2 I am just curious about the arrangement between
3 the universities -- I won't raise again the issue
4 I raised on Day 1 -- but you say that there are
5 conditions for withdrawal and I think you exposed
6 clearly that any university withdrawing would be
7 responsible for liabilities incurred before it
8 withdrew.

9 But what about decommissioning
10 costs. Would a university withdrawing now still
11 be responsible for decommissioning costs if it
12 occurs 15 or 20 years from now? Is that
13 envisioned now?

14 DR. SHOTTER: I think my
15 understanding is if, say for example, the facility
16 closed down, say in 15 years time and a university
17 has withdrawn now, that means to say there is
18 actually four universities. However, the
19 decommissioning costs must reflect the initial
20 construction of the facility and the running of
21 the facility for the last 30 years. My
22 understanding would be that that fifth university
23 that has, say, withdrawn, would in fact be liable
24 to a substantial part of the decommissioning
25 costs.

1 Of course it would have to be -- I
2 mean in 15 years time if there had been
3 developments of course, then the decommissioning
4 costs would be greater than what they are now, so
5 it would be in proportion to the use that they
6 have actually made over the years. That is my
7 understanding.

8 MEMBER GIROUX: That is something
9 you would want to put on paper I guess.

10 DR. SHOTTER: I think it is almost
11 off paper. My understanding is it is essentially
12 that is understood.

13 As Lutz has already referred to, I
14 think that is my understanding that it is in part
15 of the venture agreement it is actually stated.

16 But, John, do you have any
17 comments on that?

18 DR. McDONALD: It is John
19 McDonald. I am Chairman of the Board of
20 Management of TRIUMF.

21 There is a joint venture agreement
22 which spells out the liabilities, and my
23 interpretation of that agreement would be exactly
24 as the Director has described, that each
25 university would be responsible for activities up

1 to the time that they withdrew, and that would
2 include issues related to the cost of
3 decommissioning the facilities that were in
4 existence at the time that they withdrew.

5 THE CHAIRPERSON: Ms MacLachlan.

6 MEMBER MacLACHLAN: Thank you.

7 Just to continue along that line
8 of thinking with respect to the decommissioning
9 plan and any funds that would be required for
10 decommissioning, I got the impression that the
11 intent of TRIUMF was to recover or at least be
12 covered by Industry Canada for any decommissioning
13 funds. Is that correct?

14 DR. SHOTTER: Yes, that is
15 correct.

16 MEMBER MacLACHLAN: You have a
17 letter from the head of the NRC -- I'm sorry --

18 DR. SHOTTER: He is the President
19 of NRC, yes. Dr. Carty.

20 MEMBER MacLACHLAN: Yes. Right.

21 But is there anything from
22 Industry Canada to indicate or give TRIUMF any
23 assurance that Industry Canada would indeed cover
24 these funds?

25 DR. SHOTTER: I think this matter

1 has actually been brought up at a meeting
2 essentially with TRIUMF and Industry Canada as
3 part of their regular Agency meetings. So
4 therefore this matter is fully in the minutes of
5 those sort of meetings.

6 The statement about the best
7 efforts will be sort of made to try to actually
8 get the costs from the federal Industry Canada has
9 in fact -- they are in the minutes. Industry
10 Canada is fully aware of that because they are
11 part of the meeting.

12 DR. McDONALD: The understanding
13 that we have, and it will be much better defined
14 once we have a formal statement of what the
15 decommissioning costs are from the study that is
16 going on now, but as you heard in the
17 presentation, should it become necessary to
18 decommission all other activities would at that
19 point cease.

20 The understanding that I believe
21 the Agency Committee on TRIUMF, which is chaired
22 by the President of NRC -- and incidently it is
23 NRC that is our conduit to Industry Canada --, but
24 Industry Canada is represented on that Agency
25 Committee, and I believe the understanding is

1 clear that TRIUMF has an operating budget that in
2 the event of a decommissioning the likely scenario
3 would be that operating budget would simply
4 continue through the year required -- or whatever
5 time required for decommissioning, but should, for
6 any reason, that not happen, then the universities
7 are ultimately liable.

8 That is really the statement as it
9 is now. We would love to have something in
10 writing from Industry Canada of course. We don't
11 have that right now.

12 MEMBER MacLACHLAN: Have any of
13 the universities earmarked funds for this
14 contingency?

15 DR. McDONALD: The universities --
16 I can't speak for all of them. Carleton, for
17 example, has just been added to the group.

18 But I know at my own university,
19 and I'm sure it has happened at every one of them
20 that have been involved for a period, the
21 University Board of Governors have reviewed the
22 situation, understand their ownership and
23 understand their liabilities very clearly at the
24 Board level.

25 So I am quite confident the answer

1 to that is yes.

2 DR. HAMDULLAHPUR: If I could add
3 a word.

4 In addition to my TRIUMF duties I
5 am the Vice-President of Research at Carleton
6 University, one of the five members of this joint
7 venture, and we were fully aware of the
8 decommissioning cost in case Industry Canada did
9 not come up with the funds. So we are fully aware
10 of our obligations in terms of decommissioning and
11 we accept it.

12 MEMBER MacLACHLAN: It is one
13 thing to accept a potential future liability
14 conceptually but it is another thing to build that
15 into a budget. Has that translation taken place?

16 DR. HAMDULLAHPUR: This was
17 discussed and the university -- please don't quote
18 me on this -- has a substantial contingency fund
19 in case such event occurs to fund the
20 decommissioning, its portion of the
21 decommissioning cost.

22 MEMBER MacLACHLAN: Okay. Let me
23 come at it from a different perspective, then.

24 What is the anticipated lifespan
25 of this facility?

1 DR. SHOTTER: That is, of course,
2 very difficult to actually answer because any
3 research facility is a dynamic organization and
4 certainly at the moment TRIUMF is going through a
5 very dynamic stage of development. In fact, now
6 it is one of the top laboratories in the world for
7 its particular area of science. It is in fact
8 leading the world. Many countries around the
9 world would like to catch up to TRIUMF.

10 But I think in fact probably,
11 because of the developments that have taken place
12 in the last sort of few years, we have at least
13 about a 10-year lead over the rest of the world in
14 the particular science that we are conducting. So
15 I certainly think that we have a 10-year lifespan.

16 If the laboratory is sufficiently
17 dynamic during that 10 years I am sure it can even
18 continue beyond that.

19 So I would predict -- of course it
20 is very difficult to predict into the future, but
21 I would predict that it probably has at least a
22 lifespan of 15 years and even more.

23 MEMBER MacLACHLAN: Okay.

24 Thank you.

25 I have a question of staff.

1 Staff mentioned that the training
2 plan submitted by TRIUMF was adequate but
3 ambitious. Could you tell us a little bit more
4 about why you think the plan is ambitious? In
5 what areas is it ambitious?

6 And is it the plan that is
7 ambitious or its implementation? If it is its
8 implementation, how does that marry with the fact
9 that there is a facility that is up and running
10 and has been running and operational at what
11 appear to be fairly high success rates?

12 MR. HOWDEN: I am going to ask
13 John Power to address that question.

14 MR. POWER: Our emphasis on the
15 area of training has been for TRIUMF to take a
16 systematic approach. So when we say the plan is
17 adequate, we mean that it is adequately
18 implementing the systematic approach to training
19 as we see it and as we have discussed with TRIUMF.

20 I think the ambitious part of it
21 was the -- essentially TRIUMF has committed to
22 everything we would ask them to do, but like the
23 time schedule in which they say can do that seemed
24 a bit ambitious to us. We would be very happy if
25 they succeed, but it seemed ambitious. So we were

1 intending to follow up just to make sure they
2 stayed on schedule.

3 MEMBER MacLACHLAN: So if I
4 understand you correctly, the ambitiousness is the
5 systematic commitment to paper in a disciplined
6 way their approach to training, as opposed to the
7 quality of training of the operators themselves?

8 MR. POWER: Yes.

9 MEMBER MacLACHLAN: Okay.
10 Thank you.

11 Back to TRIUMF again. You have
12 set up a couple of task forces, one with respect
13 to quality assurance, the other one with respect
14 to housekeeping. What are the tasks for those
15 task forces and their timelines for completing
16 those tasks?

17 DR. SHOTTER: As regards the
18 quality assurance, I consider the quality of work
19 that comes out of TRIUMF to be of the highest
20 level. As Lutz has actually referred to, TRIUMF
21 is an international laboratory and it is highly
22 respected around the world.

23 We do a lot of work for other
24 laboratories around the world, in particular the
25 European CERN Laboratory, which is a truly

1 international laboratory. We undertake work for
2 that, and in fact even this week I have a letter
3 from the authorities there stating how pleased
4 they are with some of the work that we have
5 actually done for the CERN Laboratory.

6 So I think the quality assurance,
7 actually where it matters, is in fact very high at
8 TRIUMF.

9 Perhaps what we haven't actually
10 sort of done is followed again the documentation
11 of quality assurance. Where in fact that helps us
12 to improve our standards, then I am very keen,
13 where it indeed does actually help us to improve
14 the very high standards that already exist.

15 So, yes, we are looking actively
16 into implementing some, as it were, paper trail in
17 order to actually sort of improve the high level
18 of work that is already there.

19 As regards sort of housekeeping,
20 as Lutz has already referred to, TRIUMF is a very
21 dynamic research facility and, as such, perhaps
22 people work sort of faster than in fact the
23 housekeeping would sometimes sort of dictate.
24 They should essentially sort of clear up behind
25 them. They tend to actually sort of go faster

1 than in fact perhaps is good from the point of
2 view of keeping things tidy.

3 I, as the new post as Director of
4 TRIUMF, have actually sort of gone around the
5 actual site and I am encouraging people to maybe
6 stop their active work and in fact sort of maybe
7 tidy up after them.

8 But I think that this maybe -- I
9 think when the inspectors have actually come
10 sometimes they have remarked about sort of
11 housekeeping, maybe it is a little bit untidy in
12 certain areas. As I said, I think that this is a
13 result of a very dynamic research environment.

14 But, yes, I think that we can
15 improve in this field and in fact I have
16 instigated certain organization changes to ensure
17 that we do improve in this field.

18 But, as I emphasize, we are a
19 dynamic place. We are not essentially providing a
20 static service, it is very dynamic, and therefore
21 to some extent this will always be a slight
22 problem, but I am addressing it.

23 MEMBER MacLACHLAN: Thank you.

24 THE CHAIRPERSON: Dr. Giroux.

25 MEMBER GIROUX: Continuing along

1 the same lines, in your document the applicant has
2 a number of statements which are a bit challenging
3 for staff and I would like to explore some of
4 them.

5 On page 10 concerning quality
6 assurance you mentioned that you sometimes receive
7 conflicting advice from staff. Could you give me
8 an example or two of that?

9 MR. MORITZ: Yes. I can answer
10 that in that when the new CNSC regulations came
11 out, as you know there is a requirement in those
12 regulations that nuclear facilities -- all nuclear
13 facilities I think -- have to have a quality
14 assurance program. The statement is unqualified.
15 It simply says that there must be a quality
16 assurance plan or program.

17 So our question to the CNSC staff
18 was basically that we wanted to know how such a
19 program -- what it needed to address and was it to
20 be addressing only safety issues or was it to be a
21 blanket program that covered all aspects of the
22 operation.

23 In that respect we had one CNSC
24 staff member come and basically say that it was
25 unqualified, that we needed to address all aspects

1 of the operation.

2 When we requested that someone
3 from the CNSC come and give us an explanation of
4 their expectations, a different person came to
5 visit, and that person quite clearly said that
6 they were only concerned about safety issues, just
7 that the quality assurance plan needed to apply
8 only to safety issues.

9 So we were somewhat taken aback at
10 that point because we had geared up and had people
11 come to the presentation by the CNSC staff person
12 from across TRIUMF and, quite frankly, I was
13 somewhat disappointed or taken aback because when
14 he said that many people in the room just turned
15 off because they thought that it didn't apply to
16 them.

17 So we have had conflicting views
18 on what is expected of us.

19 MEMBER GIROUX: That is the main
20 issue that you were referring to in your original
21 document?

22 MR. MORITZ: Yes.

23 MEMBER GIROUX: Thank you.

24 I would like staff to react.

25 Also, on the same page they say

1 that they find it curious that staff is imposing a
2 deadline instead of providing guidance. Could you
3 also clarify your position?

4 MR. HOWDEN: Barclay Howden
5 speaking. I will address both of those points.

6 In our opinion, we have been
7 consistent in our essential QA requirements and
8 there is consensus between all our staff on these
9 requirements. We have communicated these in
10 writing.

11 Although it can happen, and we are
12 hearing, our intentions are not to give mixed or
13 conflicting messages. So we are committed to
14 continued dialogue with TRIUMF to make sure there
15 is a clear understanding of our requirements and
16 that we clarify any fuzzy messages.

17 I think the important thing is
18 that safety is critical, but I think the other
19 thing is overall management can impact safety, and
20 so I think those messages may not have been well
21 delivered. But, as I say, we are committed to
22 continued dialogue to make sure that they have a
23 clear understanding of our requirements.

24 In terms of QA, we do see it as a
25 continuous improvement-type activity because the

1 focus here is on ALARA. However, we need to
2 achieve minimum levels so that we can say that
3 that minimum level has been achieved.

4 So what we anticipate is that the
5 license condition, when met, shows that a minimum
6 level of QA has been put in place. But we would
7 not want them to stop there. We think that they
8 should continue looking at ALARA and go for the
9 continuous improvement.

10 So we don't totally disagree with
11 them, but we have to be able to draw a line that
12 says they have met the license condition and have
13 met the requirements of the regulations.

14 MEMBER GIROUX: Thank you.

15 My other question is, there are
16 statements on page 7 saying essentially that
17 staff -- they don't use those words -- is over
18 zealous in applying regulations to what is,
19 according to the applicant, a small risk operation
20 and that for fear of being accused of lack of
21 diligence they are applying very strict standards
22 to them.

23 Could you answer that question?

24 MR. HOWDEN: Barclay Howden again.

25 There are two main aspects that we

1 look at when we form our assessment of whether an
2 applicant is qualified or not. One is, we look at
3 past performance. Two, we look at systems and
4 programs they have in place to ensure the good
5 performance continues or that poor or fair
6 performance improves. So much of our focus is on
7 the second area.

8 In the context of risk, what we
9 have done with TRIUMF is we have determined that
10 they do indeed have a low risk profile based on
11 their hazards, which are well characterized in the
12 mitigation measures they have in place. I think
13 the past performance has been demonstrated.

14 What we are doing is looking
15 towards the future and what we see is there is a
16 lack of formality with regard to their management
17 systems. It doesn't mean they are not there, but
18 there is a lack of formality and they are making
19 efforts to go there.

20 This is where the focus of our
21 attention has been. We see the need for
22 continuous improvement to ensure ALARA is
23 maintained.

24 With regard to being over zealous,
25 we have -- for quality management, for example, we

1 have requirements that have been submitted to them
2 that talk about what the elements are. These
3 elements are the same that are going out to
4 facilities with similar risk profiles.

5 Where it changes is when you get
6 into the details of the complexity and the risks
7 posed.

8 In our opinion, we are trying to
9 ensure that our requirements match the
10 complexities and the risks.

11 Dr. Aly, who is the line manager
12 on this, would like to comment as well.

13 DR. ALY: I guess TRIUMF tried to
14 give the impression that we treated them like
15 power reactors and I would like to assure the
16 Commission that we are not doing that. We are not
17 treating them like a power reactor by any means.

18 Being a Class IB facility does not
19 mean they are being treated like power reactors,
20 because some of the Class IA facilities that are
21 much smaller than TRIUMF, like SLOWPOKE reactors
22 for instances, so we apply appropriate level of
23 regulation to the facility based on the risk that
24 Mr. Howden just mentioned, and we don't intend to
25 do that.

1 MEMBER GIROUX: I have one more
2 question, one comment coming out of these answers.
3 What I'm thinking is, on the
4 comments on the housekeeping and the lack of
5 formality, I think they go together. Even though
6 it is a dynamic research enterprise and that you
7 are always doing things new, you still want to
8 have -- well, staff is looking for minimum of
9 formality and a minimum of housekeeping also just
10 to make sure that the risks are maintained very
11 low. That is my understanding of these two
12 issues.

13 I have another question for staff,
14 just a clarification.

15 In the document that we have
16 today, 34.B I think, you say that the licence
17 would be issued to the five universities. On
18 Day 1 you mentioned that the licence would be
19 issued to the Governors of the five universities.
20 Is that the same thing? Is that the same wording?

21 DR. ALY: It's the same wording.

22 MEMBER GIROUX: Thank you.

23 THE CHAIRPERSON: I just wish to
24 acknowledge that the applicant, Dr. Giroux, would
25 like to comment on your previous question if you

1 are agreeable to that.

2 MEMBER GIROUX: Sure.

3 MR. MORITZ: I would just like to
4 clear up any misunderstanding about that
5 statement. I think we have had a long
6 relationship with CNSC staff and previously the
7 AECB staff and those relations have, for the most
8 part, been very cordial.

9 We respect the dedication of the
10 staff and their diligence and we would not want to
11 imply at all any fault in their behaviour. It's
12 simply I think that the point we were trying to
13 make was that the regulations are written in such
14 a way that they apply equally to facilities of a
15 very great degree of difference and risk and it is
16 left to the CNSC staff to interpret how to apply
17 those regulations.

18 I think it's only human nature
19 that they apply in such a way that is the most
20 conservative way as they would not be very willing
21 to have a more relaxed view because the risk is
22 less because obviously that is their role, to
23 control us and I think that was the point we were
24 trying to make, that it's just that the
25 regulations are so general and apply to all types

1 of facilities that it's a difficult job for the
2 CNSC staff to find the right point of balance on
3 how to interpret them for a facility such as
4 TRIUMF because TRIUMF is unique in Canada. There
5 are not other facilities like it. That was the
6 point we were trying to make

7 THE CHAIRPERSON: I don't want to
8 start a debate and let me assure you I will not
9 let that happen here.

10 However, I will allow one more
11 comment from CNSC staff, if they wish on this, and
12 that matter will be closed.

13 MR. HOWDEN: We don't have any
14 further comments.

15 THE CHAIRPERSON: Mr. Graham.

16 MEMBER GRAHAM: A question I have
17 to the applicant: What was your budget in 2001 to
18 operate this facility?

19 MR. SHOTTER: In 2001 it was \$40
20 million.

21 MEMBER GRAHAM: What is it in
22 2002?

23 MR. SHOTTER: It's at about the
24 same level.

25 MEMBER GRAHAM: What is it going

1 to be for -- I presume your calendar years are --

2 MR. SHOTTER: Well it's April to
3 April.

4 MEMBER GRAHAM: I guess you put in
5 place in your submission this morning certain
6 things you are going to be doing and certain other
7 aspects with regard to safety, with regard to
8 training, with regard to insurance, and so on, and
9 those things.

10 How much extra funds are you
11 attributing to do these extra things that you are
12 going to do?

13 MR. SHOTTER: In fact, for this
14 particular year we are in the active process of
15 drawing up the budget now. In fact, Lutz has
16 actually sort of made a presentation to us
17 actually even this week for the extra resources
18 needed to undertake sort of certain actions that
19 we have already sort of stated. These funds we
20 are looking actively at.

21 I can assure you that that is high
22 on our priority list.

23 MEMBER GRAHAM: Approximately how
24 much additional funds are you looking at?

25 MR. SHOTTER: Well, I think for

1 the -- well maybe, Lutz, you should answer.

2 MR. MORITZ: The total budget for
3 the safety aspects which is simply a materials
4 budget -- this does not count the salaries of
5 various people -- is the resources that are
6 required in terms of consultants, or whatever, and
7 things like that -- the total budget for the
8 safety operations is approximately \$300,000 a year
9 and we have asked for an increase, I think, of
10 something like \$60,000.

11 MEMBER GRAHAM: But that does not
12 include salaries.

13 MR. MORITZ: No.

14 MEMBER GRAHAM: Are you adding any
15 additional staff?

16 MR. MORITZ: We are in the process
17 of hiring one staff, but that's unrelated to some
18 of these questions that are raised today here.

19 MEMBER GRAHAM: The commitment
20 from the partners, the partner universities toward
21 the \$40 million or the proposed additional funds,
22 annual budget or the additional funds that will be
23 required, is there a sense that all will buy in?

24 MR. SHOTTER: Sorry, I don't
25 understand the question.

1 MEMBER GRAHAM: I guess what I am
2 saying is if you need an extra million or two
3 million, or whatever it's going to come at, are
4 all of the university participants, are they all
5 agreeable?

6 MR. SHOTTER: No. In fact, this
7 would actually have to come out a fixed budget.
8 Our budget is fixed over five years. So any extra
9 money that is actually needed in any areas has to
10 come out of the fixed budget. So what goes in one
11 budget will have to come out of another section.

12 MEMBER GRAHAM: I didn't realize
13 that. So you are saying that your budget is fixed
14 at \$40 million approximately, \$40 million a year
15 for five years. When are the five years up?

16 MR. SHOTTER: The five years are
17 up in 2005.

18 MEMBER GRAHAM: So you are just
19 into that. Okay.

20 Just one question with regard to
21 decommissioning, and I know it has been talked
22 about a lot, but there has been a company hired to
23 do this, Beacon International. The report will be
24 out by mid-2002. Funds have been allocated to pay
25 for this.

1 My question is: Will the study
2 give all of the details of exactly what the
3 decommissioning costs will be and at what years,
4 2015 or 2020, or what it is?

5 MR. SHOTTER: Yes, in fact it
6 should give all the details that are needed at the
7 present time. Now, in fact, if we pay extra funds
8 then this can be kept active as each year goes by.
9 But this will cost a lot of extra money.

10 By the way, this cost of
11 decommissioning is actually quite considerable and
12 when the budget was put into place, first of all
13 for this particular five years, we did not
14 understand the need for that because we were not
15 asked to do that.

16 So therefore this is an extra cost
17 that has to be found out of the other parts of the
18 budget which mean to say the research actually is
19 less because of that.

20 MEMBER GRAHAM: You are talking
21 about the \$225,000?

22 MR. SHOTTER: Yes, but it will
23 actually cost more than that. When the final
24 bills come in it, in fact, will cost more than
25 that.

1 MEMBER GRAHAM: In your \$40
2 million annual budget, do you have any contingency
3 funding that you are setting aside for
4 decommissioning?

5 MR. SHOTTER: No.

6 MEMBER GRAHAM: Will the study
7 also identify where the guarantees will come from
8 or what the responsibilities will be? The reason
9 I ask that is the NRC letter that you have, or the
10 agreement that you have right now from NRC, is a
11 laudable one, but it doesn't really -- it's not
12 really -- the way it reads in our presentation
13 it's not really binding.

14 MR. SHOTTER: Yes, that is my
15 understanding. The decommissioning cost is
16 essentially a technical undertaking. That
17 actually will identify what the technical needs
18 are and what the costs are to meet the
19 decommissioning sort of requirements. But
20 essentially my understanding is that it is a
21 technical effectively study.

22 MEMBER GRAHAM: One other
23 question, I guess, to staff. When the study is
24 complete, when all of the work has been done on
25 it, who will have the review? Will it come as a

1 meeting item or will it come before the Commission
2 again, or will it be strictly dealt with by staff?

3 MR. HOWDEN: I will ask Dr. Aly to
4 respond.

5 DR. ALY: We will deal with that
6 the same way we dealt with similar facilities.
7 Once agreements on financial guarantees have been
8 reached by the applicant, we will bring that to
9 the attention of the Commission for a decision.

10 THE CHAIRPERSON: Ms MacLachlan.

11 MEMBER MacLACHLAN: Yes, just a
12 very brief question to the applicant.

13 You mentioned that you have a
14 budget of \$40 million a year. Does that money
15 come from the participant universities, or does
16 that money come from elsewhere, and what about the
17 revenue side? You mentioned the activities that
18 are taking place through TRIUMF. Do you derive
19 revenue from any of those activities for outside
20 clients?

21 MR. SHOTTER: Yes. The \$40
22 million is federal funds. Yes, there is a certain
23 level of funds that actually sort of flow from
24 technology and sort of transfer activities. Most
25 of these funds are used essentially to pay for

1 certain things like the infrastructure charge that
2 we have to actually pay to UBC because we are on
3 the UBC campus, which we cannot use federal funds
4 for.

5 So there are various sort of
6 charges like this that we have to actually find
7 extra sort of money for. It cannot be federal
8 funds and the technology transfer does provide
9 such funds to undertake these obligations.

10 MEMBER MacLACHLAN: But it's not
11 an economically self-sufficient operation.

12 MR. SHOTTER: I think it's more or
13 less sort of -- it doesn't actually cost TRIUMF
14 money to run the technology transfers, to answer
15 your question. There is a positive flow back to
16 TRIUMF as a result of these activities, and as I
17 have actually said, the monies that flow back
18 enable us to actually fulfil certain obligations
19 we couldn't operate by if we didn't actually have
20 these extra funds. So it is a positive
21 contribution.

22 I think actually TRIUMF -- I have
23 experience with many laboratories around the world
24 and TRIUMF has been, and is, extremely successful
25 in technology transfer. I think it's one of the

1 best examples of this I know from many sort of
2 countries around the world.

3 MEMBER MacLACHLAN: Could you just
4 clarify for me what you mean specifically by
5 "technology transfer"?

6 MR. SHOTTER: Yes, indeed. The
7 high level of expertise that is actually gained by
8 people at TRIUMF is indeed of interest to various
9 industrial concerns. So for example a particular
10 industry could actually come to us and consult us
11 in certain problems that they actually have, and
12 because of the unique experience that we have, we
13 can actually sort of transfer our expertise to
14 industry.

15 This is essentially what
16 technology transfer means. That can be in the
17 whole range of industries from the sort of health
18 providers right away to sort of food
19 sterilization. There is a wide range of
20 industrial activities that have actually made use
21 of TRIUMF's unique expertise. That's what we mean
22 by technology transfer.

23 MEMBER MacLACHLAN: Thank you.

24 THE CHAIRPERSON: Thank you very
25 much.

1 I would just like to make a couple
2 of comments from the Chair. First of all, since
3 it was the Chair who asked you to come, I would
4 like to show my appreciation to particularly the
5 members of the Board of Governors for coming. I
6 appreciate that very much. We didn't ask any
7 specific questions with regards to the Safety and
8 Security Committee, but we are very pleased that
9 this exists and we think that this is an
10 appropriate model for an institution.

11 There have been some references
12 with regards to differences between research
13 institutions and other institutions and we take
14 that into account in looking at this. However, I
15 would like just to note that three Members of this
16 Commission, including myself, have been both on
17 the bench and in research institutions. So we do
18 understand research, and since I ran two
19 ISO-qualified research laboratories I do feel that
20 we are able to know the difference and to
21 understand people coming in and out of
22 institutions.

23 That said, there appears to me
24 some issues with regards with housekeeping and
25 quality assurance. Perhaps some of the

1 definitions that we are using are not clearly
2 understood. Housekeeping is not the same as
3 accidents in our mind, and there has been, I
4 think, a great change in thinking towards how
5 systems being put in place, as Mr. Howden has
6 noted, have sought to increase safety systems that
7 don't necessarily result in specific short-term
8 pay off, but in fact are systems of management
9 that are essential to operations of facilities in
10 general. So we do appreciate that.

11 So I do appreciate your coming. I
12 do appreciate this emphasis and I do urge the
13 institution to continue to have dialogue with the
14 CNSC staff and perhaps with other institutions in
15 terms of this growing body of knowledge as to
16 management, culture, housekeeping, quality
17 assurance and what this means because things have
18 really changed.

19 My last comment is with regards to
20 decommissioning. When we look at public interest
21 with regards to all the facilities that we
22 regulate, the issues of decommissioning have
23 become more and more important. So I guess I can
24 say it isn't something that will go away, that the
25 issues of human protection, but also protection of

1 the environment and dealing with this are probably
2 one of the major challenges facing the industry in
3 the large sense of the word.

4 With that, I would like to just
5 turn it over to the Secretary for completion of
6 this hearing.

7 M. LEBLANC: Merci, madame la
8 présidente.

9 This completes the record for the
10 public hearing on the matter of an application by
11 TRIUMF for a licence to operation Class I and II
12 particle Accelerator facilities at its site in
13 Vancouver, British Columbia.

14 The Commission will deliberate and
15 will publish its decision in due course. It will
16 be posted on the CNSC website as well as
17 distributed to participants.

18 Merci.

19 THE CHAIRPERSON: Thank you very
20 much.

21 We will take a ten-minute break.
22 So we will start at two minutes after ten with the
23 next hearing.

24 Thank you.

25 --- Upon recessing at 9:52 a.m.