**HEARING DAY ONE**

**Canadian Light Source, University of Saskatchewan: Application for an amendment to its Particle Accelerator Operating Licence**

THE CHAIRPERSON: I would, therefore, like to begin the hearing today by calling for an oral presentation by Canadian Light Source as outlined in the CMD documents 02-H25.1 and 02-H25.1A. I will turn it over to Mr. BENMERROUCHE.

Good morning, sir.

**02-H25.1 / 02-H25.1A**

**Oral presentation by Canadian Light Source**

MR. BENMERROUCHE: Madam President and Chair, Members of the Commission, CNSC staff, ladies and gentlemen, good morning.

My name is Mohamed BENMERROUCHE. I am the Manager of Health, Safety and Environment of the Canadian Light Source Inc. CLSI for short. Accompanying me today is Bill Thomlinson, Executive Director of CLSI, who is on my left here; Mark de Jong, Director of Operations, who is on my left further down; and Les Dallin, Manager of Accelerator Operations at CLSI, who is behind

us. Tony Whitworth, Vice-President of Finance and Resources of the University of Saskatchewan, U. of S., could not be here with us today, but will be available via conference call to answer any questions the Commission Members may have.

The first slide shows a recent picture of the Canadian Light Source facility. The purpose of this presentation is to provide Members of the Commission with a summary of the information that was submitted to the CNSC staff in support of an amendment to the operating licence to authorize Phase III beam commissioning of the CLS.

Phase I beam commissioning, which included the linac, was approved by the Commission on May 28, 2001, and the required tests and radiological characterization were completed on March 3, 2002.

Phase II beam commissioning was approved on December 11, 2001, and the amendment for the booster commissioning was approved on June 7, 2002. The initial tests and radiological characterization for Phase II commissioning were completed on September 26, 2002.

Today's application is concerned

with the third phase of commissioning the CLS, which includes the storage ring and beam lines.

My presentation is organized as follows. First I would like to start with an introduction. I will briefly describe the various phases required for commissioning the CLS facility. A final report on Phase I commissioning will be discussed, followed by a preliminary report on Phase II commissioning. I will then discuss Phase III application and finally present the summary and conclusion.

The CLS facility includes high energy, low power in the few watts range, electron accelerator and synchrotron light beam lines in the infrared to hard x-rays energy range from .02 electron volts to 100 Kilo electron volts. The accelerator is considered a class 1B electron accelerator.

The next slide describes the various components of the CLS facility. The proposed commissioning of the CLS will proceed under three phases which will be described in the next few slides.

Phases I and II have been completed. Phase III is expected to start

February 2003, and we are here today seeking the Commission's approval to proceed to Phase III of the CLS commissioning.

The electron accelerator system includes three major components: 300 million electron volts linear accelerator, a 2.9 billion electron volts booster synchrotron, and a 2.9 billion electron volts storage ring. The 220 KEV electrons generated by the gun are bunched and accelerated to about 250 MeV in the linear accelerator, linac. They are then transported from the linac to the booster via the linac to the booster transfer line for injection into the booster.

The electrons are then accelerated in the booster to a final energy of 2.9 GeV, before they are extracted from the booster and transported into the BTS or booster-to-storage transfer line for injection into the storage ring.

This process continues once per second for up to 120 booster cycles, about two minutes, as it is required to reach an average circulating current of 500 milliamps in the storage ring. However, numerous effects result in the loss of electrons from the storage ring over a

period of several hours to tens of hours.

The storage ring is refuelled when the average circulating circuit has decayed to half its nominal value of 500 milliamps.

The CLS facility will be used for its synchrotron light which is emitted in the tangential direction of the electrons orbit in the storage ring. The synchrotron light is very intense and ranges from infrared to hard x-rays, typically in the range of .01 electron volts to 100 kilo electron volts.

The light is directed toward an experimental station using synchrotron light beam lines. The synchrotron light is a powerful tool for basic and applied studies in biology, chemistry, medicine, physics and environmental, as well as applications to technology such as x-ray lithography micro-machines, material characterization and trace element analysis.

This picture here represents the dipole magnets that bend the electron beam upwards from the sub-basement toward the linac to the booster tunnel located at the basement level. The beam dump shown here is the end point of Phase I. The bending magnet is the starting point of

Phase II.

This picture depicts part of the linac-to-booster transfer line located in the basement level. The beam dump, where the beam was directed during Stage I or Phase II commissioning is identified.

This shows the injection area into the booster ring. The injection septum in blue and the kicker magnet in silver are identified. The direction of the electron beam is from right to left.

Here we show part of the booster ring inside the booster tunnel. The blue structures are the dipole magnets which keep the electron beam in orbit around the booster ring. The green structures are the quadrupole magnets, which focus the electron beam.

The booster extractor septum is shown in blue here. The beam dump, shown here, is the end point of Phase II. The beam was not taken beyond this point during Phase II commissioning.

A section of the storage ring is shown here with the support pedestals and girders and a few magnets. The red and green magnets are the sextupoles and quadrupoles respectively.

The storage ring magnets are shown here wrapped and awaiting installation. The installation of all magnets is expected to be completed by April 2003.

Here is a wide angle view of the storage ring bulk shielding and its ratchet wall structure. A typical opening from which the synchrotron beam lines will be emerging is indicated.

The proposed beam commissioning of the CLS will proceed under three distinct phases. The commissioning of the CLS will be carried out under the same operating licence PA10L-02.02/2006. Currently the operating licence limits the operation of the accelerator to Phases I and II only, as indicated under licence condition C2. A Commission approval is required prior to proceeding with subsequent commissioning phases. This will require the amendment of the operating licence and submission of supporting documentations.

Phase I is the recommissioning of the existing linac accelerator and part of the linac to the booster transfer line, LTB, up to the beam dump BST0004-01. The linac and this part of

the LTB are located in the sub-basement of the facility.

Phase II involves the commissioning of the booster ring, including the remainder of the LTB transfer line and part of the booster-to-storage transfer line or BTS up to beam dump BST1400-01. The LTB brings the electron beam from the sub-basement level to the main level, where the booster ring and the BTS are located.

Phase III involves the commissioning of the storage ring, including the remainder of the BTS transfer line. This phase will also include the eight synchrotron beam lines. It is expected that this phase will be ready for beam commissioning in February 2003.

At the completion of Phase III commissioning, a request will be submitted to amend the licence to authorize routine operations. The CLS facility is projected to begin normal operations in January 2004.

The drawing shown here depicts the start and end point of the three commissioning phases. Phase I is shown in red; Phase II is shown in green; Phase III is shown in blue.

Phase I commissioning included the

recommissioning of the linac and commissioning of the linac-to-booster transfer line up to the beam dump BTS0004-01. It began on June 29, 2001 and continued until March 3, 2002. Phase I beam commissioning for radiological characterization was conducted in two parts. Part 1 dealt with the radiation measurement taken at the electron energy of 180 million electron volts or MeV and ran from August 28, 2001 until September 23, 2001.

Part 2 involved measurements of the nominal operating energy of 250 MeV and ran from January 17, 2002 until March 3, 2002. The commissioning proceeded as planned with all the necessary precautions in place. A final report was submitted to the CNSC in August 2002.

A summary of the radiological measurements are illustrated in the next few slides.

Before we do that, here I illustrate the various axis zones within the main floor level of the CLS facility. Similar zone designation is used on other levels of the facility. The green shaded area belongs to the free access zone and the yellow shaded area belongs to the restricted access zone.

The reception area within the lobby level, as well as outside the facility, are considered the public access zone. In addition, measurements have been carried out in the occupied areas within each zone.

The radiation levels within a restricted area during normal beam operating conditions are indicated in red here. For comparison, the background levels, when the beam is off, are shown in blue.

TLDs were used for the measurement of the total accumulated radiation. This chart displays the accumulated gamma dose during the indicated exposure period at various locations within the free and restricted access zones.

The minimal detectable dose for this kind of TLD is .1 milliSieverts. The larger peak is measured in the location within the restricted access zone, not accessible to personnel when the beam is on. The dose was measured under normal beam operating conditions, as well as missteering scenarios.

The same as the previous chart but for the neutron monitoring.

Illustrated here is the gamma

radiation body dose exposure distribution of the commissioning team during the third quarter from July 15 to October 14 and fourth quarter, October 15 to January 14 of 2001 and the first quarter, January 15 to April 14, 2002.

Phase I beam commissioning occurred in the third quarter of 2001 and the first quarter of 2002. Only one person received a dose of 0.2 milliSieverts. The rest of the commissioning team received less than the minimal detectable dose of .1 milliSieverts.

Similar to the previous slides but for the CLS personnel not involved in the beam commissioning activities.

The result of the measurements shown in the green bars are compared with the shielding model predictions in the blue bars. The theoretical calculations tend to overestimate the measured radiation levels up to a factor of three difference. However, the trend of the data is reasonably well reproduced.

Phase II commissioning included commissioning of the LTB transfer line not covered under Phase I, the booster ring and part of the booster-to-storage transfer line. The

commissioning began on June 2002 and continued until September 2002. The commissioning proceeded as planned with all the necessary precautions in place.

Radiological measurements were carried out in the occupied area within the public access, free access and restricted access zones. The radiological data is being analyzed and some preliminary results have been submitted to CNSC staff. Some recently analyzed data can be shown at the conclusion of this presentation if the CNSC is interested.

The CLSI has provided the required information in support of Phase III commissioning approval application.

The analysis of radiation hazards for Phase III operations are described in the CLS safety report and Photon Beamlines Safety Guidelines. The design criteria, as well as the radiation shielding calculations, have been reviewed by CNSC staff. The bulk shielding for the storage unit was completed in April 2001.

The conventional technical construction report pertinent to Phase III commissioning has been incorporated in the CLS

safety report. The verification and validation of the storage ring access control interlock system, which is an integral part of the personnel safety system, was completed in September 2002. The full report was submitted to the CNSC.

The Phase III commissioning plan describes the principal components of the BTS, storage ring, and synchrotron beam lines components and the actions required to safely commission and meet the requirements as the final stage of the CLS commissioning.

The composition of the Phase III commissioning team has been provided to the CNSC staff, including their qualifications and experience in accelerator operations. The CLSI staff has many years experience in designing, installing and commissioning electron accelerators.

The CLS human factor workscope specifies the human factor analysis, design and assessment activities that are to be undertaken in support of the design, commissioning and operation of the CLS facility. Recent submissions included accelerator operator qualifications and training, and operator task description and validation plan.

The installation of the storage ring components and services should be completed by April 2003. The installation of photon beam lines and services should be completed by September 2003.

The U. of S. has established Canadian Light Source Inc. to lead the construction product and operate the facility. An agreement entitled "University of Saskatchewan and Canadian Light Source Inc. License Agreement" has been established between the U. of S. and CLSI to ensure the continued expansion, maintenance and operation of the facility in a manner to ensure it is a state-of-the-art synchrotron light facility. The agreement includes articles on CLSI duties and obligations, the U. of S. licence of the facility, appointments, health safety and environment, reporting and monitoring, facility enhancement and maintenance, communications and marketing, indemnity and insurance, term and termination.

The CLS Inc. hold the CNSC licence to construct and operate the facility. The CLSI has primary responsibility for all health, safety and environmental programs at the CLS facility under the direction of the CLSI Executive

Director. The CLSI Executive Director is the signing authority on the CNSC licensees. The CLSI Health Safety and Environment Manger is authorized to act as the contact person on all technical issues associated with the CLSI licenses pertaining to the CNSC and other regulatory authorities.

The Preliminary Decommissioning Plan or PDP was revised taking into account the CNSC review comments. Detailed decommissioning cost estimates have been developed to give a reasonable justification for the total decommissioning cost. The U. of S. has been involved in the preparation of the decommissioning plan and cost estimates. The U. of S. has accepted the decommissioning final end-state objectives. The building and its associated conventional services will not be dismantled and will be available for other uses by the U.of S.

CLSI will establish a restricted decommissioning fund to ensure that adequate resources are available to complete the identified decommissioning activities. The restricted fund will be funded from the operational budget of the CLSI and reviewed periodically for adequacy and

changes in circumstances. Prior to establishment of the entire fund required, a financial guarantee from the U. of S. will be provided for the full amount of the decommissioning costs. The financial guarantee, if required, will be in the form of a letter of credit.

The CLS keeps the public fully informed as the project develops. The CLSI has been conducting frequent presentations and tours of the facility. Individuals are often given a handout or brochure, shown a promotional video, and/or a slide presentation. Background information includes the facility overview, some scientific research applications, and some items of general interest such as introduction of HSE programs. An HSE poster is displayed prominently at the CLS facility.

A variety of communication vehicles have been used, such as news conferences, new releases, media interviews, videos, brochures, newspaper supplements, advertisements, tours, public lectures and community open houses. Audiences include general public, media, Canada's science community, federal and provincial politicians, federal granting councils that fund

the CLS, prospective corporate partners, users, customers and high school students and so on.

An outreach coordinator has been participating in various workshops, arranging public tours, preparing educational and promotional material. Recently, commissioning of the booster was covered by local media.

In summary, Phase I commissioning of the linac LTB was satisfactory. Radiological measurements and their various beam loss scenarios were carried out and show that the radiation levels are below the design levels under normal operating conditions.

Phase II commissioning, which includes the booster ring, was completed in September 2002. Comprehensive radiological measurements have been carried out and we are in the process of analyzing the data.

In regard to the Phase III application, we believe that we have met all the requirements for Phase III commissioning. We, therefore, respectfully request the Commission to approve an amendment to the operating licence authorizing CLSI to proceed to Phase III commissioning of the CLS.

Thank you for your attention, and we look forward to answering any questions the Commission Members might have.

THE CHAIRPERSON: Thank you very much.

**02-H25 / 02-H25.A**

**Oral presentation by CNSC staff**

THE CHAIRPERSON: With the concurrence of the Commission Members, I am going to turn to CNSC staff before I open the floor for questions. On that basis, I would like to turn to Mr. Barclay Howden, who is Director of Research Facilities Division, to give the staff presentation.

These are outlined in CMD documents 02-H25 and 02-H25.A. Mr. Howden.

MR. HOWDEN: Madam Chair, Members of the Commission, for the record, my name is Barclay Howden, Director of the Research Facilities Division. Mrs. Maloney is not well today; thus, she is unable to attend the hearing. With me today are Mr. Ramzi Jammal, Director of the Class 2 Facilities and Dosimetry Services Licensing Division, Dr. Jacinthe Plante, Project

Officer in the same division, and Mr. Peter Fundarek, Project Officer in the Wastes and Geosciences Division.

Canadian Light Source Incorporated has completed Phase II commissioning of the CLS facility and has applied to be allowed to proceed to Phase III commissioning.

My presentation this morning will cover the key points of CMDs 02-H25 and 02-H25.A, which recommend the amendment of the particle accelerator operating licence to allow Canadian Light Source Incorporated to perform Phase III commissioning of the Canadian Light Source particle accelerator facility at the University of Saskatchewan.

To outline our presentation, I will start with a description of the commissioning phases for the facility, followed by a brief update on outstanding issues from the last public hearing on November 15, 2001 and the status of other programs; CNSC staff's position on the application; the proposed hold point on the licence; and, finally, CNSC staff conclusions and recommendations.

CLS Incorporated has proposed to

commission the facility in three phases. Phase I included the recommissioning of the linear accelerator or linac and part of the linac-to-booster transfer line. CLS Incorporated has completed Phase I commissioning and submitted its report. This report has been accepted by CNSC staff.

Phase II is now completed. It included commissioning the remainder of the linac-to-booster transfer line, the booster and the booster-to-storage ring transfer line up to the beam dump BST1400-01, the boosters and electron synchrotron accelerator that accelerates electrons to 2.9 giga electron volts. In order to lift a hold point during this phase, a licence amendment was authorized by a designated officer in June 2002.

The draft preliminary Phase II commissioning report was delivered to CNSC staff this week. A review of the report has just started.

Phase III includes commissioning of the remainder of the booster-to-storage ring transfer line, the storage ring and the synchrotron radiation beam lines. The storage

ring is a synchrotron in which the electrons will keep circulating for a few hours. A licence amendment is necessary before proceeding with each phase. And after Phase III commissioning, CLS Incorporated will have to request another amendment of their licence to authorize routine operation.

After the previous public hearing on the CLS application in November 2001, there remained several items that needed clarification and follow-up by CLS Incorporated. These were: The relationship between CLS Incorporated and the University of Saskatchewan, preliminary decommissioning plan, decommissioning cost estimates, financial guarantee and, finally, human factors.

Regarding the first issue, a new contract has replaced the previous one, clarifying the relationship between CLS Incorporated and the University of Saskatchewan. This contract specifies that CLS Incorporated has the full authority and responsibility for holding CNSC licences and to operate the facility while meeting legal requirements. CNSC staff finds this contract, as it relates to the protection of

health, safety and the environment, acceptable.

Regarding the second issue, a revised preliminary decommissioning plan was submitted to the CNSC and it has been accepted by CNSC staff. Regarding the decommissioning cost estimates, CNSC staff has determined that further clarification is required before CNSC staff can conclude that the cost estimate for decommissioning is adequate. It is anticipated that this issue will be closed in January 2003. When that is done, work on an appropriate financial guarantee can be completed.

With regard to a financial guarantee, CLS Incorporated has proposed a financial guarantee consisting of a separate fund to be built up over a period of time, supplemented, as required, by a letter of credit from the University of Saskatchewan. CNSC staff acknowledges this commitment. However, time will be required to work out the details after the cost estimates are finalized. Therefore, CNSC staff has recommended a licence condition to address this issue.

Regarding human factors, CLS Incorporated is working on the proposed changes at

the CLS facility. Some of the changes are physical, such as improving signage throughout the facility, while others are process related, such as making procedures more user friendly. CNSC staff finds the progress on this issue acceptable.

In previous applications, a number of programs were reviewed and judged to meet requirements. CNSC staff revisited the following four programs: Quality assurance, environmental protection, emergency preparedness and response, and conventional health and safety, and determined that they continue to meet requirements.

Additionally, CNSC staff has visited the facility four times in the past two years. The most recent visit, an inspection in September 2002, confirmed that the radiation safety measures and controls needed for further commissioning are in place.

For the licence amendment application, the CNSC staff review included the report on Phase I commissioning, including information on the radiation surveys taken, the commissioning plan for Phase III, radiation safety during Phase III commissioning, including the lock-up procedure for Phase III, the licence

agreement between the University of Saskatchewan and CLS Incorporated, the qualification of CLS Incorporated staff for Phase III of commissioning, and preliminary decommissioning plan. Staff found these items acceptable.

Phase III includes the commissioning of the beam lines located outside the accelerator shielding wall. Presently CLS Incorporated has submitted only partial information about the beam lines. The risk from synchrotron radiation is considered to be much lower than the radiation produced from the acceleration of the electrons. In addition, the design of the beam lines incorporates safety features that will further reduce the radiological risk to the workers.

Nevertheless, if the Commission allows the project to go to Phase III, CNSC staff proposes a hold point that prevents CLS Incorporated from commissioning of the beam lines without a licence amendment. Additionally, because the risk from synchrotron radiation is much lower than accelerator area radiation and because the radiation protection strategy, namely shielding, personnel exclusion interlocks and

radiation monitoring that has been successfully employed in the previous two phases of commissioning, will be used for the beam lines too,CNSC staff proposes that the amendment to lift the hold point be considered by a designated officer.

CNSC staff, therefore, concludes that the application to amend the licence to permit Phase III commissioning of the Canadian Light Source facility is acceptable; CLS Incorporated is qualified to carry on Phase III commissioning; and CLS Incorporated will make adequate provision for the protection of the environment, the health and safety of persons and the maintenance of national security.

CNSC staff recommends that the Commission accept the CNSC staff's assessment that an environmental assessment is not required; amend the particle accelerator operating licence issued to CLS Incorporated to allow Phase III of commissioning; delegate to a designated officer the exercise of the authority for releasing the hold point to allow CLS Incorporated to commission the beam lines; include a condition requiring a financial guarantee in the CLS licence.

Please note that for consistency with recent licence conditions on financial guarantees, the licence conditions should read slightly different than what is on the slide. It should read:

> "The licensee shall provide no later than December 31, 2003 a financial guarantee for decommissioning acceptable to the Commission or a person authorized by the Commission."

The words the "licenced facility in a form and value" have been removed for consistency with other licence conditions.

Finally, delegate to a designated officer the exercise of the authority to determine the acceptability of a financial guarantee.

That concludes my presentation. Staff is available to respond to questions. Thank you.

THE CHAIRPERSON: Thank you, Mr. Howden.

The floor is now open for questions. I will start on my right. Dr. Barnes,

do you have any questions?

MEMBER BARNES: I would like to address the issue of the financial guarantee, if I may, because there seems to be an inconsistency at least in the documents that we have here. I refer specifically to staff CMD 02-H25, section 2.1. That is at the base of page 2, a sentence in the middle of that last paragraph states as follows:

> "According to this contract, CLSI is responsible for the security, the insurance, the decommissioning and the financial guarantee."

Yet, elsewhere in the documents -- I am not sure I have that at my fingertips -- I think it was from the university that the university has essentially the responsibility under the agreement for providing the financial guarantee. Is it the university or CLSI?

THE CHAIRPERSON: Since you quoted a CNSC document, Dr. Barnes, I would suggest that the staff should start, and then go to the university.

MR. HOWDEN: With regard to the financial guarantee, in the contractual agreement

between the University of Saskatchewan and CLSI Incorporated, there is a stipulation that CLSI Inc. will develop the separate decommissioning fund out of its operating funds over a period of time.

In the preliminary decommissioning plan, which is where the financial guarantee is actually proposed, that separate fund is identified to be established, but then there is a statement that, in the interim, as the fund is built up, that the University of Saskatchewan would then provide the letter of credit to cover the amount required for full decommissioning until the fund gets up to that particular point.

MEMBER BARNES: If I then come back to the wording of your licence condition, it is the licensee who shall provide the financial guarantee for decommissioning, which is CLSI, which essentially doesn't have the financial resources to provide that guarantee?

MR. HOWDEN: At the moment, that is the case.

MEMBER BARNES: How can you ask the licensee in this licence condition to do something which is quite clear it has the

inability to do so?

MR. HOWDEN: It would be similar to a case where another licensee did not have the financial resources but went to the bank to get a letter of credit to be supplied to them.

In this case, CLSI would get a letter of credit from the University of Saskatchewan to cover that fund.

MEMBER BARNES: So you expect by December 31 for CLSI to have that letter from the university giving you that assurance?

MR. HOWDEN: At this moment in time, we expect by December 31, 2003 that we would have an acceptable financial guarantee. We haven't determined whether the letter of credit from the University of Saskatchewan would be acceptable yet.

MEMBER BARNES: We have two weeks to go and it is Christmas in there. You are trying to put a condition in here -- okay, thank you.

THE CHAIRPERSON: Would the applicant like to add anything to that, to the question from Dr. Barnes?

Mr. Whitworth.

MR. WHITWORTH: Dr. Whitworth. Thank you very much. Thank you for the arrangements made for me to participate today.

In answer to Dr. Barnes' question, the university has been making arrangements to provide a letter of credit to the project to cover off the requirements for the financial component of the decommissioning plan. It was deemed that if you like, the credit worthiness of the university at this point was greater than CLSI, so that it is easier for the university to secure that letter of credit.

I hope that answers the concerns that Dr. Barnes has raised.

THE CHAIRPERSON: Thank you. Any further questions, Dr. Barnes, at this time.

MEMBER BARNES: No.

THE CHAIRPERSON: Dr. McDill.

MEMBER McDILL: Thank you. I just have a few questions. We received a package of basically cover pages from documents that were received previously. Can you tell me if the rest of the document contains the remaining signatures? Each of these has only one signature. I have a number of them here. One is dated 2002/09/10. It

is 8.12.90.1, revision A, CLS Commissioning Phase III, and it is signed by E.L. Helene, but the remaining signatures are blank.

MR. BENMERROUCHE: We submitted numerous documents in support of Phase III commissioning. Most of the documents have been signed by all reviewers as being approved, except for a few documents. One of them is the beam lines. Still some of the comments are being incorporated.

MEMBER McDILL: I have five documents in front of me with only one signature. Does that sound about right to you.

MR. BENMERROUCHE: I see probably there is only three that have not been fully signed. But the remainder of the documents have been signed, reviewed and approved and sent to the CNSC staff.

The documents related to the beam lines have been signed by the authors, but are still under review currently. One of the questions that we have, we need to -- the decommissioning document has been fully signed and approved by the university and we submitted that to the CNSC staff.

MEMBER McDILL: That is the preliminary decommissioning plan?

MR. BENMERROUCHE: And also the cost estimate. There is another document describing the cost.

MEMBER McDILL: How about the safety report?

MR. BENMERROUCHE: The safety report is still under review. But the safety report and the document relating to the beam lines, two of them are pertaining to the review, and some of the comments are being incorporated in those three documents.

So only three documents. The rest of them have been fully approved.

MEMBER McDILL: Thank you. I have one other question. What is the approximate size of the CLSI? You have a number of drawings showing the site but no scale.

MR. BENMERROUCHE: The main building is square and it is roughly 83 by 84 meters. The old building, it is a bit tricky. It is what, an L shape.

But the new building is the bigger structure and it is 83 by 84 meters.

MEMBER McDILL: Approximately how much green space in rough numbers surrounds the building? I understand it is a compass so it is a bit tricky.

MR. BENMERROUCHE: I will just give you some numbers. There are a few buildings not far away from the CLSI building within, let's say, 40 meters. On the north side is a large green field and there is a road that separates the university and also the Elevation Centre and there is also the waste management across.

Did that answer your question?

MEMBER McDILL: Thank you. That is fine.

THE CHAIRPERSON: Mr. Graham.

MEMBER GRAHAM: Thank you. I have a couple of questions with regard to the slide presentation. The first one is on page 6, the LTB tunnel that you presented this morning.

That LTB tunnel and the beam dump, was that in operation at the time?

MR. BENMERROUCHE: Yes.

MEMBER GRAHAM: Just for clarification for safety purposes, in the slide it shows some nylon rope tying up some things there

that don't look very professional compared to the chain falls that would be used to lift. So would you like to comment on that, if you notice right on the far left-hand side near the magnets.

MR. BENMERROUCHE: Mark de Jong, Operations Director, is going to answer this question.

MR. de JONG: When I take a look at that photo, that photo was taken during final assembly of that. The indication of that is the far left-hand side shows the vacuum chamber connections and it is obviously wide open. So there was certainly no beam that could have gone through there. That photo was taken during construction, I can tell.

MEMBER GRAHAM: Nylon rope is not there now, I presume?

MR. de JONG: No.

MEMBER GRAHAM: Another question I have is with regard to your slide 17, normal conditions, it is radiological conditions in a restricted area. What is good and what is bad here? Sometimes arrows show good, bad, indifferent. What I am wondering is, and I guess that would be to the CNSC staff, are any of these

graphs, to the extent that should cause concern, any of the graphs on page 17?

MR. HOWDEN: From a staff perspective, these are all acceptable.

MEMBER GRAHAM: Even the second one, where it is T1 IM, which goes up to 1.8, that is acceptable, is it?

MR. HOWDEN: Yes, it is. That is a restricted access area during operation.

MEMBER GRAHAM: If we could go to page 20, commissioning team radiation exposure distribution. I presume that is number of persons, that is nine persons in total had exposure and one of them reached a dose of over 0.2 milliSieverts. I doubt if it is unacceptable, but is that anything to be alarmed about or not? Would you comment on that?

MR. HOWDEN: No, the dose limits for people are 50 milliSieverts in any year and 20 milliSieverts averaged over five years and this is .2 milliSieverts.

MEMBER GRAHAM: Are all of the people that are involved in this operation, those nine and within the operation there, are they all in the national registry for exposure? I believe

there is a national registry, isn't there, for people working in the industry, and are these people recorded in the national registry?

MR. HOWDEN: Yes, they are all in the national dose registry.

MEMBER GRAHAM: I have just one other question, Madam Chair, on page 21. Is there anything in that slide that would be cause for concern? As a layperson, sometimes it is hard to understand high, low, arrow and so on, but your comment on that also?

MR. HOWDEN: We have just received this information so we haven't had a chance to take a good look at it. I would like to maybe suggest that Canadian Light Source comment upon it.

MR. BENMERROUCHE: I assume you are referring to page 21?

MEMBER GRAHAM: That is correct. The number of persons, I presume that between 70 and 80, and above 80 means may not be 80 different persons, but there could be one person with eight different times in there or ten, I presume?

MR. BENMERROUCHE: For these slides, the number of persons actually for the .4

milliSieverts there is only one person. For the yellow there is also one person who received .2 milliSieverts. Also, these are monitored on a regular basis and also they are in the national registry.

Again, these levels are below the limit, the CNSC limits, and well below our design criteria also for CLSI.

MEMBER GRAHAM: If I may just have one other question again as a layperson.

I realize it is acceptable, but is this blue more or less for the norm? I mean, people working in the industry would receive doses of.01 milliSievert. That would be for the norm and that would be even walking around, a visitor would contract that much or is that something that should the scale be way down as time goes on, down to 10 or 12 or even less than that?

MR. HOWDEN: I am going to ask Ramzi Jammal to respond to you.

MR. JAMMAL: Yes, the public level occupational dose is 1 milliSievert at .4. That is below the 1 milliSievert limit.

But as your question is based on the national dose registry, people in that

industry, these levels actually are within the national average and, if anything, it is just a little bit below.

However, since we received this information today, we have asked CLS to actually give us the information why it is .4, even though it is below the limit. They are providing the information to us, actually.

THE CHAIRPERSON: Perhaps I could just clarify. Slide 20 is the number of people as part of the commissioning team, which is a total of nine persons. Is that correct?

MR. BENMERROUCHE: Yes, it is correct.

THE CHAIRPERSON: Slide 21 is the non-commissioning personnel, and that means a total of, depending on the quarter, anything from mid seventies, to low eighties were personnel that were in the facility in the non-commissioning. Is that correct?

MR. BENMERROUCHE: Correct.

THE CHAIRPERSON: Then in terms of each of those brackets, the red line means one person, the yellow line means one person?

MR. BENMERROUCHE: Yes.

THE CHAIRPERSON: So in the third quarter of 2001, you had one dose of greater than .2 milliSieverts and one between .1 and less than .2, is that correct, in terms of interpretation for the yellow dose for quarter 3? I am just clarifying with Mr. Graham the question because Mr. Graham had raised the issue: Is this actual number of persons, and the answer is yes, it is. Is that correct?

MR. BENMERROUCHE: Yes, It is the number of persons.

I just want to add one more point. Unfortunately, the greater sign is not correctly put in there. The red ones are doses greater than .2 milliSieverts. It does not include . 2. The yellow ones include the doses between .1, anything above .1 and less or equal to .2.

I also want to add something. If you measure the dose around the CLS facility, just from natural background, you will get roughly between .3 to .4 milliSieverts a quarter for any person in the public just sitting there.

So typically levels which are .2 milliSieverts are below level. It is just like background exposure.

THE CHAIRPERSON: Mr. Graham, did you have a question of clarification?

MEMBER GRAHAM: Just as clarification. There was one person, though, with the highest dose in that quarter three that was equal to .0.4. Is that right?

MR. BENMERROUCHE: Yes, one person.

MEMBER GRAHAM: So that red is more than .2, but it was .4. That is what you are saying?

MR. BENMERROUCHE: Yes, the red ones are the doses greater than .2 milliSieverts. And greater than .2 milliSieverts includes only one person, which is .4.

MEMBER GRAHAM: CNSC staff are going to review that because you just got that information today. Is that my understanding?

MR. JAMMAL: Yes, that is very true. We just asked the CLS this morning on this issue, even though it is acceptable, we would like to have further investigation from CLS as to what happened.

THE CHAIRPERSON: Just finally for the record, could the CNSC staff state the

guideline that you use for these facilities in terms of doses?

MR. JAMMAL: Sorry, can you elaborate on your question a little bit more. The guidelines to determine the doses to the workers or the calculation that was used to determine the doses?

THE CHAIRPERSON: The doses for the workers, what would be acceptable and should be not exceeded in this facility?

MR. JAMMAL: Again, we have the national dose registry levels that are being published based on the workers' occupation and the range that is expected of people in their occupation, administrative and medical groups and so on and so forth. These are the national guidelines that we are using to compare against.

THE CHAIRPERSON: And what are they?

MR. JAMMAL: They vary widely, actually. I am sorry if I am not giving you the right answer. Probably I didn't understand the question properly. But they vary, depending on the occupation and the classification of the worker.

The classification of nuclear energy workers, in the guidelines there is a maximum limit. For the general public again it is 1 milliSievert and we are monitoring against this. The guideline is literally the exposure based on occupation to the work and the ranges of the worker in that group of people.

THE CHAIRPERSON: I guess what I am trying to get for the record is this. You have a commissioning team and you have some doses here, and my understanding is that this is still well below the limit that would be acceptable in this facility. Then you have a non-commissioning personnel with exposure. For the record, and I think Mr. Graham referred to this too, you have these levels given. How do they compare to what would be the guidelines that can't be exceeded for this facility? Is it 1 per cent, 10 per cent or is it 150 per cent? What exactly are we looking at here, and that is for the record, and the people that read these transcripts.

MR. JAMMAL: For the record of these people, .4 milliSievert is roughly 60 per cent below the 1 milliSievert limit to the general public in that occupation.

THE CHAIRPERSON: Ms MacLachlan.

MEMBER MacLACHLAN: In making the CNSC presentation this morning, you referred to documentation that the CNSC had just received last week and you had not had an opportunity to review it.

I wanted you to clarify what that was and what the implication was for this hearing today. I understand from the comments that the information represented in one or two of the slides in the presentation made earlier by the Canadian Light Source, that information wasn't received. Was there further information that is pertinent to this hearing today received by CNSC?

MR. HOWDEN: In terms of information that was received, the slides from CLS that were used today, we received approximately at the same time you did, approximately a week ago because of the supplementary deadline, which I think were based on the preliminary Phase II results or to a certain extent. I am not 100 per cent sure of that.

But we also received on Monday, the preliminary Phase II commissioning report, preliminary. It didn't have all the information

in place.

What we have done is for this hearing we reviewed the Phase I report, which we accepted. We looked at the Phase III commissioning plan, but the important thing that we did was we went to the facility on September 28th of this year, while Phase II was still ongoing, to look at the safety measures that they were going to have in place for Phase III. So even though they were continuing commissioning beyond that point to make sure that the machine was running I guess as they would want the machine to run, we went in and looked at those safety measures and those, specifically, were is the shielding in place and within specifications, are the personnel exclusion interlocks in place, and we verified they were, and is the radiation monitoring systems that are there to assist them and to warn them if there is a problem, are they in place.

At that time, yes, they were. We verified it. So that gave us confidence to come to the Commission to recommend it based on Phase I report and our inspection during Phase II of the measures being put in place to protect the workers

for Phase III.

So with regard to the Phase II commissioning report, we will definitely be looking at it to see if there is anything that has come out that was unexpected and we would follow up on that through our routine compliance activities with the licensee.

MEMBER MacLACHLAN: Thank you very much.

I have another question for CLS and the university. This is with respect to the fund that you are wanting to establish for decommissioning.

You say that it is a separate decommissioning fund, but I would like to receive assurances that this would be a fund that would not be merged in any way with general revenues or general accounts of the university and that there would be terms attached almost as though the money were in trust for very specified purposes that are tied to the licence.

MR. BENMERROUCHE: I will direct this question to Mark de Jong, and then after that the university, Tony.

MR. de JONG: It is our intent to

establish that as the detailed legal mechanics to be worked out for the financial. But it will be effectively a separate trust fund exclusively for decommissioning.

The arrangements that we are making with the university for the letter of credit are to basically cover any difference between what is in the fund at any one time and what is required for actually decommissioning.

THE CHAIRPERSON: Yes, Dr. Whitworth, are you interested in speaking?

MR. WHITWORTH: I will just reinforce what Dr. De Jong has said. The plan is to establish a trust fund, a restricted trust fund, into which on an annual basis monies from CLS will be deposited and gradually built up to meet the letter of credit commitment that the university will have made.

THE CHAIRPERSON: Dr. Giroux.

MEMBER GIROUX: I will start by following up on this and asking Dr. Whitworth: You made a strong statement before and I think you have reinforced it today or repeated it today that the University of Saskatchewan is backing the financial guarantee.

But you don't have actual final numbers as to the cost of decommissioning yet. So I was wondering what is the form of your agreement? I don't need numbers, but does it state a maximum or does it state just whatever will be required, whatever it costs.

MR. WHITWORTH: Today we have worked on the best assumptions and are planning that the letter of credit meet the requirements of the CNSC, whatever that might be. We have had estimates within a certain range. The university's commitment is to meet what is required.

MEMBER GIROUX: Thank you. That answers my question.

I have a follow-up on the previous discussion raised by Ms MacLachlan about the staff making a recommendation with incomplete results from II. I understand, and I heard your answer, that you are going to look at that. I am assuming that you are confident that nothing will come up in the report that might jeopardize your recommendation today of going to Phase III, because you have a strong recommendation, and you have to be confident that there is nothing faulty

in the Phase II operations in commissioning, and the results that might require redesigning or retrofit or something.

Could you make a clear statement on that.

MR. HOWDEN: Yes, we are confident on that. Part of it is based on the past results that we have seen from Phase I, plus from our latest inspection.

During those times, there were radiation measurements done to confirm that the predictions were actually much higher than what was expected. Based on that, plus the programs that they have in place, specifically quality assurance, the emergency response, health and safety, which we have deemed acceptable, provide another level of assurance that they are going to continue to operate safely into the future.

So we do have that level of confidence. If something does come up, which can always happen, we would have to take a look at the situation and, if necessary, take regulatory action. We have certain tools at our disposal such as requests through Section 12.2 of the general Regs or orders under the Nuclear Safety

and Control Act.

But, yes, based on what we have seen and what we are seeing, we are confident that Phase III can be performed safely.

MEMBER GIROUX: Thank you. Turning now to CLS, I have a few technical questions.

On page 15 of the first document we received, the one with text, you talk about possible missteering scenarios. Can you give me one or two examples of what could happen, what could go wrong in steering?

MR. BENMERROUCHE: One of the components of the accelerator is you have steering coils that you steer the beam left or right or up or down. Very, very mild steering. We are not talking about bending the beam.

During the commissioning, we take measurements during the normal operation. You take the beam to whatever location is required. Then we also took measurements, what if the missteering is done to the limits of the steering coils and see what is the consequences of that. We have numerous steering coils along the accelerator just to steer the beam, and we also

use some diagnostics to see where the beam is. They call them sometimes popups or transitional radiation monitors.

We look at all those various scenarios and say, what are the consequences; what would be the rendition under those consequences, and then what to do in case nothing happened.

So far for the Phase I, I will summarize the Phase I, because the whole accelerator structure is in the sub-basement and the shielding for all the accelerator system under the sub-basement is overly shielded, we barely see anything unusual. All the levels that we measured everywhere -- we have taken comprehensive measurements -- they were within fluctuation levels.

The reason we can say that is because we also did measurements before the machine was running, well before, to see what were the radiation levels in the facility and then we compared against. So even under missteering conditions we didn't anything find anything substantial in the free access or the restricted access zones.So all the radiation is well contained within the accelerator closures. That

is for Phase I.

For Phase II it is a little bit different. We have to bring the beam up into the main hall and then the whole accelerator is into the main floor, and all the shielding is new. So under those conditions, we had to be very careful and do all the measurements that we can do, both inside and outside, because the whole main ring can also has some consequences for the outside building.

We have taken measurements over 500 points all around the facility, in the free access zone, in the public access zone and the restricted access zone. Furthermore, we also use passive area monitoring. We have those TLDs that we put around the facility inside and outside and in all occupied locations, including offices, for example, and we exchange those on a quarterly basis.

So far, in the free access area, the radiation levels are within the background fluctuations. We did notice if you bring the beam into certain locations, for example, if you take the beam and you dump it into a specific location, you will expect that the radiation level

downstream from that beam dump will be higher because you are dumping the beam in a certain location. So certain peaks that we saw are well understood and under control, and you can always shield those with local shielding.

But to summarize, the bulk shielding, as far as I can tell, it is satisfactory and it is adequate for the booster. So the levels are quite reasonable. I am very confident that there is not going to be any big issue. The only issue is to maybe provide some local shielding in certain areas, for example, some of the openings in the shielding and all that. But those are under control, so we know where they are.

MEMBER GIROUX: Thank you. A further question. I will be referring to slide 22. That is where you give us the calculation versus the experimental measurements. I was surprised to see on the right of the graph you have the theoretical measurements and the radiation, I guess, two or three times as high as the actual one. I was wondering what was the source of that? Is that difficult to predict or is it over conservative design?

MR. BENMERROUCHE: If you look at a model, in order to make the model more usable, you need to know what the source of radiation is. And then from that source, you see what is between the source and the location where you want to measure that radiation.

Under the accelerator, the source of radiation is not well defined. It could be lost anywhere. That is why in the previous graph you see almost a flat distribution, because when the beam is lost you don't see a specific peak like when we have a beam dump. You will see it more or less level off.

To make contact with the monitor predictions you need to see what the source is. You can either have a line source or a point source, and it becomes really hard because when you look at the accelerator structure, there are so many things in between. There is, for example, the magnet shielding. You can see beam pipe; you can see conduits; you can see cables; you can see concrete. It is quite complicated.

What we have done is we have just taken a few points where we think we can make comparisons and, based on that assumption, we say

what is the prediction. We have done the same thing for Phase II and the model predictions are the same thing. Well, they overpredict the values.

In general, the model predictions tend to overestimate the measured values.

MR. THOMLINSON: A way to think about modelling in this situation is you have to take a worst case assumption. In fact, the way you do that the losses, as has been stated, are generally fairly distributed. But for the modelling, you essentially can take a point source for the radiation and, therefore, you always will overestimate, and that is the appropriate procedure. Then you shield against that overestimation.

MEMBER GIROUX: So there is some intentional conservativeness in your modelling?

MR. THOMLINSON: Absolutely. A very conservative modelling is always the approach in this type of shielding.

THE CHAIRPERSON: Perhaps I could just start round 2. Dr. Barnes do you have any further questions?

MEMBER BARNES: I have to return

to where I left off the last time with the financial guarantees.

To staff, I may have misheard you then. I think you said that by this coming January, next month, you would have some agreement on the decommissioning costs. Is that what I heard?

MR. HOWDEN: Yes, we had a meeting with CLS Incorporated a couple of weeks ago to discuss the costs and to discuss the issues that we needed clarification on. From that meeting, we felt that CLS Incorporated understood our concerns through the discussions and that they would be able to resubmit the cost estimates to address the points of clarification that we required.

MEMBER BARNES: If I understand it, you have reached a fairly firm agreement or understanding between the two sides here on the level of financial guarantee. If that is the case, why does the licence condition have the date December 31, 2003? In other words, why do you need another year in order to have that specific guarantee received by you?

MR. HOWDEN: We are requesting that time period because we still think, for the

financial guarantee, it will require much more discussion with CLS Incorporated. The financial guarantee proposed by CLS Incorporated is sort of two-pronged, where they are going to build up the decommissioning fund, which, in their agreement with the University of Saskatchewan does stipulate that that fund has to be acceptable to the CNSC. That was another question that was raised earlier.

Then you go to the letter of credit from the University of Saskatchewan. Traditionally, for financial guarantees, we have not been accepting financial guarantees directly from other entities other than banks or government. So we wanted to explore that further.

Really, the issue is: Is the amount that is being proposed low enough such that the risk is low enough that we can accept a letter of credit from the University of Saskatchewan as opposed to from a bank. Mrs. Maloney has directed our staff to review this potential position and make recommendations to her, the reason being because it could impact other licensees who have relatively low financial guarantees required on whether they have to go to a bank or whether they can get a guarantee from an institution such as a

university.

I believe it is going to take time to work out those issues and also to examine our own position on financial guarantees.

MEMBER BARNES: Can I come to the second issue, and that is how the fund is actually built up I guess just to paint two scenarios, one scenario is that there is a low user community and the other is that there is a full user community. In other words, part of the revenues for the operation of the light source certainly comes from the partners, as I understand it, and also there will be a set of user fees that will generate part of the income.

The fund, presumably, is going to be accumulated by some transfer of monies either from the partners, the partner contributions, or from the user fees.

I am trying to find out whether this is built up annually by sort of a guaranteed amount that would come in irrespective of the user fees, i.e. therefore, all of the responsibility falls back to the partners or to the university, or whether it is essentially built up as an amount, assuming there is a surplus.

Is there a guarantee that this fund will be built up in a systematic way irrespective of the total operating revenues received by the Canadian Light Source?

MR. BENMERROUCHE: I will direct this question to Mark de Jong.

MR. de JONG: The discussions that we have had on building up the fund is the intent that if the facility has an anticipated life span of approximately 20 years to build that full fund up over that period of time, we are talking somewhere between $250,000 and $300,000 a year. That is based on what we have on that current estimate for the decommissioning.

That will be coming right off the top; that will be part of our basic commitment going in each year regardless of what number of users we have. That is certainly what we are planning on when we were working on our budget.

The funding partners for operations, we have certainly been informing them that the contributions to this decommissioning fund will be part of what we will be using with their ongoing contributions. It will not be dependent upon the user fees.

MEMBER BARNES: So I understand that that is accepted. You have not only informed them, but they accept that as part of the arrangements?

MR. de JONG: One of the funding partners is the University of Saskatchewan and they have certainly accepted that. Their commitment is over $1 million a year. We will have that amount of money from someone that will permit us to use it in that fashion.

MEMBER BARNES: To the staff, I assume this is also part of the financial guarantee issue, this issue of a guarantee to be able to build up the decommissioning fund appropriately?

MR. HOWDEN: That is correct.

THE CHAIRPERSON: Dr. Giroux.

MEMBER GIROUX: I have a further question about the hold point that you are discussing in the document. Before you send the beam lines outside the shielded area, my question is: Will decommissioning include hitting actual targets with the beam line or will it be only with beam dumps outside the storage ring?

MR. BENMERROUCHE: If I understand

correctly, your question is whether or not we are going to be using any beam dumps inside the storage ring?

MEMBER GIROUX: Beam dumps or actual targets. If you are commissioning, you have to get close to operating conditions. My question is: How close do you get to operating conditions? Does commissioning of the beam lines outside the storage ring include hitting actual targets as you will be doing other operations?

MR. BENMERROUCHE: Bill Thomlinson will take the question.

MR. THOMLINSON: Commissioning of the Phase III includes, first of all, working with the shield wall completely intact, operating the storage ring itself at various operating conditions so that we are sure of its stable operation also in sort of non-normal operations.

Once we have achieved that point, then it is because there are no radiation ports open; everything is contained inside the shield wall. There are some beam lines being constructed which are diagnostic beam lines. They will be looking at the beam at that point.

Then further to your question,

which is a very good point, in order to apply for routine operations, the actual beam lines, at least those which are present at the time -- and they are all very similar in terms of safety operations -- it will be necessary to bring the photons, the light, the radiation, not the electrons -- electrons are contained within the storage ring always -- to bring the light out, down the various beam lines, which are in existence, under controlled radiological surveys, various types of conditions and fault conditions and so forth, under the control of a commissioning team prior to any utilization by experimental users. But we will have to, in fact, emulate the real world. We will have to put the optics in place. You will get scattering from the various optics. Optics are just like mirrors and so forth, mirrors and apertures and so forth to define the beam for the end user. We will have to bring the beam into the last part of the beam line where the actual experiments take place.

Of course, all of that is based upon prior measurements and validation of the safety systems and exclusion and so forth. But it will have to be to that point, otherwise we could

not ask for routine operations.

MEMBER GIROUX: Thank you. Is staff comfortable with that scenario?

MR. HOWDEN: Yes, we are. The main thing that we will be focusing on is that it is the synchrotron radiation coming out and not any other radiation coming out.

MEMBER GIROUX: A further question. You mention on page 4 of staff's document that there is some radiation or contamination resulting from the electron beam impacting on components. What is the typical duration of the resulting contamination? Is that measured in seconds, minutes, hours or whatever?

MR. HOWDEN: With regard to the impact of the beam, it is not contamination. It is actually activation of the components and the time to decay away could be from seconds to hours, depending on the materials, depending on what parts are being activated.

MEMBER GIROUX: There is no real problem of accumulation in there if it decays that rapidly?

MR. HOWDEN: There will be accumulation over time. From a standpoint of

safety, local shielding is used to protect the workers for that. Also, when it comes to decommissioning time, how much activated the components or the shielding is will determine exactly how much of the facility has to be taken apart and it depends on the activation at that time. But it will accumulate, yes.

MEMBER GIROUX: Thank you. My final question is: What is the rate of utilization of the beam which is expected of the storage ring? What per cent of the time in terms of hours per day will the storage ring be operating?

MR. BENMERROUCHE: I want to make sure I understand the question before I answer it.

Are you talking about how long the beam in the storage ring --

MEMBER GIROUX: The beam in the storage ring. I think you mentioned that you have to replenish it after four hours?

MR. BENMERROUCHE: Between four hours to ten of hours, yes.

MEMBER GIROUX: But is your plan always to have a beam active within the storage ring?

MR. BENMERROUCHE: Yes. I want to summarize how the whole process works. There is an injection system that we need to inject electrons in the storage ring. Then once the electrons are in the storage ring, they circulate for hours. At one point, you are going to start losing electrons and you have to replenish or refill the storage ring. The refill can range between four hours to ten, 12 hours. It depends on many, many factors.

But as far as the injector system, that is what the whole commissioning is about, Phase I, Phase II, it is only going to be running up to two minutes every four to ten of hours. Then after that, the whole system will shutdown and there will be no radiation. Then any time you need to refill the ring, you just start the whole injector system again, which is the linac, the booster and the BTS. That is why the measures that you measured so far, we have to take into account the duty factor of the machine.

Mark de Jong would like to add something.

MR. de JONG: I just wanted to add. I think the other half of your question is

the usage throughout the year.

It is our intent that once we get into routine operation, that in the first year we will probably operate the storage ring approximately 2,000 hours a year, but that as a mature facility over three or four years, we will basically have beam in the storage ring approximately 5,000 hours a year. That is pretty typical of the production of a lot of these other facilities.

That entails basically 24 hours a day, seven days a week for extended periods of times, followed by one month to two month shutdowns to allow any major revisions on some of the beam lines.

MEMBER GIROUX: Thank you. That is very informative. I was anticipating the operating licence hearing, but I was curious. Thank you.

THE CHAIRPERSON: My questions are what I would call clean up questions in terms of this is an amendment to the licence, but I just want to check. These are questions to staff.

There are a number of areas under the licence that haven't been discussed today, and

I just want to make sure that you are still satisfied with the compliance of the licensee in the following areas. I will just list those: Conventional health and safety, issues of security, emergency preparedness, and fire protection.

MR. HOWDEN: Yes, we are still satisfied with the licensee's compliance in those areas.

THE CHAIRPERSON: I would like to make it clear that one of the issues that is not discussed is there is a lack of scale on diagrams. There is a lack of dates on photographs and, as the staff knows, this is an area we have been trying to emphasize. It is important in terms of precision to have that kind of information in order for us to have a general picture. So that is a comment rather than any specific question.

My last question is: We noted earlier some concerns on the part of the Commission. There was a manager of QA, the position was vacant. It is now filled, I believe. Could both the licensee and the staff comment on that? Is that correct, that there is a person in that place?

MR. BENMERROUCHE: Yes, it is correct.

MR. HOWDEN: Yes, we are aware of that and they have updated their organization chart to reflect this person's position, plus their duties and responsibilities, and we are satisfied with that.

THE CHAIRPERSON: My final point is, I would just like to note for the record, if we go back to the transcripts from the previous hearing that we had in the matter, the Commission had expected that there would be more progress made than we have seen on the decommissioning plan and the financial guarantees.

I would like to note that for the record. It has been discussed quite exhaustively. But if we look back, we had expected more progress than we saw. That should be reflected in the transcripts.

Mr. Graham.

MEMBER GRAHAM: Thank you. I have a question on the employment and your management chart. I had a note there that the Q & A person, that that position was filled, but are there any positions of a key nature that are not filled at

this time within the whole organization?

MR. THOMLINSON: The answer to that is yes. The key position, long-term key position of Director of Research, Mike Bancroft is our Acting Director of Research. We are beginning an active search for that position. Health and safety, however, reports to me as Executive Director, directly to me. So there is not a direct line management authority there for health and safety.

There are other positions to be filled when we approach operations which will involve E, S and H issues both in the operations of the storage ring facility and also the experimental operations on the experimental floor. We will be recruiting and training the staff in those areas, much as at every facility a similar nature. Those will increase in number as we increase our needs in terms of the number of experiments.

Outside of those, we are also actively looking and approaching people in the E, S and H area under Dr. Benmerrouche, to continue to maintain our high level of compliance there in the E, S and H area, in particular, radiological

officer. That is active and close, we hope, to finalization.

So I believe that we are on target with regard to the E, S and H management and authority and responsibilities within our organization, particularly as we are approaching the transition from project to operations.

MEMBER GRAHAM: My question then is to CNSC staff. What check and balance or what monitoring will you do to make sure that these positions that were mentioned here this morning get filled on a sliding scale or on a critical path, I guess, as the project becomes a reality and goes from construction into actual production? What check and balance do you have on that that you can monitor that or do you have a process in place?

MR. HOWDEN: We do that mainly through our interaction with licensee on assessment issues and compliance issues. From our perspective at the moment, they have the staff to do the job and the staff that is qualified to do the job.

In the future, what we would be monitoring would be to know what is going on in

the health, safety, environmental area, if they were losing staff, but we would be focusing on their performance in terms of doses, accidents, events, that type of thing, as indicators, whether things were going well or not. If we saw adverse trends, we would then maybe do an audit on their quality assurance program to make sure that they were maintaining their management oversight and that their managed processes were actually being used to manage health and safety.

MEMBER GRAHAM: Just one further question. Do you have a staff member on site at all times similar to a nuclear generating facility or, if you don't, how often are you there to monitor things like this?

MR. HOWDEN: We don't have any staff on site. Right now we are doing inspections on a frequency of twice per year. The latest inspection, what we did was our staff from Ottawa went, but we also are now including one of our staff from our Saskatoon office, from the Uranium Mines and Lands Evaluation Division, getting them familiar with the facility such that they could go in and do inspections for us or do measurements for us and pass the information back to our

project officers.

We have just started that. Our expectation is when Phase III is running that a person from that office would go over and verify the radiation fields.

But the routine inspections are planned right now for two times per year.

MR. LEBLANC: This completes the record for the public hearing on the matter of an application by Canadian Light Source for an amendment to its particle accelerator operating licence.

The Commission will deliberate and will publish its decision in due course. It will be posted on the CNSC website and will be distributed to participants.

We will resume at 11:00 this morning. When we return, we will begin with the public hearing on the matter of the Environmental Assessment Screening Report for the return to service of Units 3 and 4 of the Bruce Nuclear Generating Station (NGS) A. Merci.

THE CHAIRPERSON: Thank you very much for attending today and thank you very much for passing through from Saskatchewan.

MR. WHITWORTH: Thank you for the arrangements.

MR. BENMERROUCHE: Thank you.