HEARING DAY 1

McMaster University: Application to renew a licence to operate a Class IA Non-Power Reactor in Hamilton, Ontario

THE CHAIRPERSON: The next item on the agenda is Hearing Day 1 on the application by McMaster University for the renewal of the McMaster nuclear reactor, non-power reactor operating licence.

January 29th was the deadline set for filing by applicant and by the CNSC staff and February 21st was the deadline for filing of supplementary information for applicant and Commission staff.

I note that no supplementary information has been filed by either CNSC staff nor the applicant.

We will begin by the oral presentation, as outlined in CMD document 01-H7.1 by McMaster University, and I turn it over to the applicant.

02-H7.1

Oral presentation by McMaster University

MR. HEYSEL: Good afternoon. For

the record my name is Chris Heysel. I am the Director of Nuclear Operations and Facilities at McMaster University.

I would like to take a minute to introduce a couple of the team members here today. Dr. Mamdouh Shoukri is Vice-President of Research and International Affairs for McMaster University.

To my right is Mike Butler. He is the Manager of Reactor Operations, and behind me in support is Dave Tucker, Senior Health Physicist, McMaster University, Charles Blahnik who is the Chief Analyst on the recently submitted Safety Analysis Report for the facility, and Rob Pasuta who is an Operations Engineer with the facility.

My presentation today will be relatively short so I will get right to it. I apologize, I have overheads, so there may be a bit of communication between me and other staff members.

My presentation is in support of a five-year operating licence for McMaster research reactor.

My presentation will cover a few points, so I will give you a general location of

our facility, a general overview of the reactor. I will touch on the products and services provided by the nuclear reactor at McMaster. I intend to highlight some changes and improvements which the staff have achieved over the recent licensing period.

I will talk about priority issues confronting staff members at McMaster currently, and talk a little about future plans. I will make a couple of statements about our performance over the licensing period and draw a couple of conclusions.

As most of you know, McMaster University is located in Hamilton, Ontario, at the corner of Main Street and Coote's Paradise and the reactor is situated on campus at the university and has been there for over 40 years.

A bit about the description of the reactor which is important to highlight the type of reactor we are. We are licensed currently to five megawatt operation. It's a materials testing reactor design. It's a pool type. Our current operation is at 75 hours per week, two megawatts thermal, and it's important to note that we have a full reinforced concrete containment building

surrounding the reactor.

It's an interesting design in that we employ plate-type fuel which is different from most facilities. We have approximately 30 fuel assemblies in the core. If you can imagine a 100,000 gallon swimming pool. The fuel is cooled by gravity draining of the water in the swimming pool, through the fuel into what is referred to as a hold-up tank where short-lived activation product is allowed to decay and then the water is then pumped through a heat exchanger back to the other end of the pool.

Another interesting feature about this reactor is that it's actually two pools. The core is suspended from what is referred to as a bridge, and if there is a maintenance activity in one end of the pool, or if there were a leak of any sort, the core can actually be moved to the other side of the pool and there is an allowance for a gate to go in to separate the two pools, to allow one side of the pool to be drained. So it's a very interesting design. It's a good design.

Currently, the activities at the McMaster nuclear reactor are centred on research and education. Many of the professors and grad

students at the university, as well as other universities, use the facility as a research tool. Another main focus is there are many departments on campus which use the reactor as an educational tool and many undergrad laboratories take place at the reactor.

We do irradiations for local universities and external universities. We have available neutron beams and the application of neutron beams for scattering and other applications. We do quite a bit of neutron activation analysis to determine different material make ups of various components. We produce medical and commercial isotopes at the facility in order to defer some of the operating costs.

We have neutron radiography facilities at the facility. There is a small Canadian company which operates neutron radiography set up at our facility to investigate engineered parts, as well as there is quite an active research program led by the engineering and physics group around neutron radiography.

We also have a hot cell within the facility where we do material testing and aging

analysis for different equipment.

I will talk to the changes and improvements that have happened over the recent licensing period. Our budget for staff has increased quite substantially, 25 per cent, as we take the facility into a new era of interest and activity, so the support has increased to embrace this new research and educational activity.

We have implemented an ongoing training program. I have received draft comments, and I believe staff members have sent the official comments to us this week which we are going to investigate with staff members to resolve.

We have had a successful transition to the new regulations, which was deemed as a major accomplishment for our facility. We have submitted a configuration management policy, again a highlight of the past three years. We have received comments from staff members and we have committed to resolve those comments with them, and we have completed a major equipment review and inspection over the recent licensing period.

We are in the midst of high enriched to low enriched fuel conversion. We are

40 per cent of the way there. The project completion of full conversion is 2005. It's just a matter of migrating the fuel out of the core.

There has been a major capital investment in safety. There have been quite extensive purchases in portable and portal radiation and contamination monitoring equipment around the facility. We purchased new cooling towers. There is a new DC battery bank. There has been quite a significant investment in equipment at the facility and one of the highlights really is a major research investment through the formation of McIARS.

McIARS stands for the McMaster Institute of Applied Radiation Science, and it represents an investment in the order of $10 million from federal, provincial, university and industry dollars to prepare or to form this institute of which the reactor will play a key role. So we are quite proud of that. A vote of confidence from various levels of government.

We have implemented a document management system which has worked well and is up and running and is doing a great job. We documented a health physics program which was a

staff requirement last time from the CNSC.

We have undergone an extensive audit of that program and I think to date there is one outstanding action which has to do with documenting a maintenance program and that will be completed this summer.

We have prepared a decommissioning plan which will be submitted to the staff in March and we have done, what I deem a very proactive move in establishing a decommissioning fund which is at arm's reach to the operations group and represents a significant amount of the operating budget which goes to decommissioning.

Priority issues in front of us. As we are all aware there are some security requirements. Those are really our high priority issue. We are in full compliance with regulations and orders to date, but there are some schedules that have to be met. So that's certainly a priority for the group.

As I mentioned earlier, we have received some comments. Generally they were, I felt, a vote of confidence from CNSC staff members on our training program, but there are some questions and some clarifications required and

some improvements for our program. So we are resolving to work hard on those.

Configuration management, again we have committed to resolve the outstanding issues or comments from CNSC staff members.

Health physics appraisal action. We will complete that final action this summer. Update our emergency preparedness program to reflect current environment. What I mean by the current environment in this instance is there are three things that we need to dovetail into our emergency preparedness program.

One is the university has set up a crisis management group to deal with non-nuclear emergencies which we have to coordinate with. Dave and myself sit on the NBC group for Hamilton, the new City of Hamilton. So I just submitted my comments this week on their NBC terrorism plan and our plan will have to again be tailored to dovetail with their plans. There was an audit of our program done with actions coming out of that which will be incorporated in our new emergency preparedness program. So there are three major items that have to be looked at as we rewrite our program.

There is an outstanding discussion between CNSC staff and McMaster to resolve the decommissioning financial guarantee which both CNSC staff and McMaster staff have committed to resolve before the next hearing. There is a derived emissions limits document which takes into account new dispersion coefficients in the literature which we have updated and it's undergoing internal review at the university and will be submitted to CNSC in March.

Future plans. We have under contract hired Thera Gamma-Metrics to design a new control system or replace the existing control system. The existing design is based on tube-based technology which there may be a spare parts issue in the near future. So we have asked them to functionally replicate our design using solid state technology and that's what they are in the process of doing. So it's our hope to have the design completed in the next couple of months and submitted to CNSC staff to review prior to actually purchasing the control system and progressing towards implementation and commissioning.

We have committed significant

funds to continue our equipment and facility upgrades. We have made a lot of progress but there are areas for improvement like in any operating facility. Things change and you need to continue that commitment to upgrading your facility.

We really see an opportunity with McIARS to strengthen the education and research capabilities of the facility. That's something that we find very exciting. We want and require more students walking around our facility, investigating the applications of nuclear technology and that's really our goal. Our product is really on two legs and we are excited that various partners have invested in fulfilling this goal of seeing more students around the facility.

I have brought with me the Safety Analysis Report. I think it was delivered to staff members this morning. It's extremely hot off the press. It was courriered last night. So we have achieved a significant goal there, something that we are all very proud of. It's time to step back. The Safety Analysis Report confirmed that the facility has a safe design and

is operated safely. However, we have all learned more about our facility so I think it behooves us to step back, look at what we have learned, and try and look for ways to further improve on our safe design.

We have started looking at succession planning. It's an industry-wide issue, certainly one at McMaster. We have identified ways to assure a successful operation from a human resources perspective and we are in the process of implementing what I hope will be a very successful plan.

I guess our performance summary can be summarized in our occupational safety and health and over the recent licensing period we haven't exceeded any regulatory dose limits. There have been no -- we haven't exceeded any regulatory limits on emissions. I should note, and I left out of my presentation a very important point, is that there have been no reportable incidents over the current licensing period which is something that the university should be proud of.

There is a continuous optimization of facilities, radiological conditions, emissions,

and worker exposures. Dave Tucker prepared some graphs, some overheads on some more historic data, but they speak volumes and they show the trends downwards for exposures and emissions and it shows the good job that the staff have done. I can present those later or I can certainly submit them to the Commission after.

In conclusion, McMaster nuclear research reactor is an important research and educational asset that operates in a manner that proactively and competently safeguards public and occupational safety. A five-year licence is respectfully requested at this time.

Thank you.

THE CHAIRPERSON: Thank you very much. With the concurrence of the Commission Members, I will not entertain questions until after we hear the presentation by the staff in this regard.

With that I turn then to the staff presentation as outlined in CMD document 02-H7 and call again to Mr. Howden.

02-H7

Oral presentation by CNSC staff

MR. HOWDEN: Madam Chair, Members of the Commission. For the record, my name is Barclay Howden. I am the Acting Director-General of the Directorate of Nuclear Cycle and Facilities Regulation.

With me today are Dr. Aly Aly, Director of the Research and Production Facilities Division, and Mr. Glenn Martin, Head of the Operational Facilities Licensing Section within the same division.

McMaster University has applied for the renewal of the McMaster Nuclear Reactor Non-Power Reactor Operating Licence for a period of five years.

CNSC staff has assessed the application and the performance of the applicant and has developed a position which is documented in CMD 02-H7. The position includes a recommendation that the Commission issue the proposed five-year licence.

I will now pass the presentation over to Dr. Aly and Mr. Martin who will outline our detailed assessment and recommendations.

DR. ALY: Good afternoon, Madam Chair, Members of the Commission.

For the record, my name is Aly Aly. I am the Director of the Research and Production Facilities Division.

CMD 02-H7 provides CNSC staff's assessment of the McMaster University application for licence renewal of the McMaster Nuclear Reactor known as MNR, and I will be using MNR from now on. This reactor is located within the campus of the university in the City of Hamilton.

To outline our presentation, I will first provide a short historical background of the facility and then discuss the risks associated with the currently licensed activities.

Mr. Martin will then detail the regulatory activities undertaken by CNSC staff to evaluate impacts of MNR operations on health and safety of workers, the public and the environment.

Mr. Martin will then summarize the operating performance and update the Commission on a few transition issues from the Atomic Energy Control Act and Regulations to the Nuclear Safety and Control Act and Regulations.

He will also summarize the status of Nuclear Security at the facility, application of the Canadian Environmental Assessment Act to

this licence renewal, and finally CNSC staff's conclusions and recommendations on the licence application

The McMaster Nuclear Reactor was built by AMF Atomics Canada Ltd. and achieved first criticality in 1959. MNR was the first nuclear reactor in Canada to be built and operated outside the Atomic Energy of Canada Limited Nuclear Research Laboratories. MNR is licensed to operate at a maximum power of 5 MW(t) with either a full core of High Enriched Uranium Fuel known as HEU or a full core of low enriched uranium fuel known as LEU.

As indicated in the McMaster University presentation, MNR core is being converted from HEU to LEU as necessitated by international safeguards and non-proliferation requirements.

The application for this conversion, including the supporting safety case was submitted in mid-1997. This application was reviewed and accepted by the AECB and MNR was authorized to commence conversion to LEU in December 1998. Full conversion to LEU is anticipated by the year 2005.

During the transition period from HEU to LEU fuel, MNR is limited to a maximum power of 2 MW(t).

I will now provide information on the risks posed by the McMaster Nuclear Reactor.

Operation of the reactor has the potential to expose staff to iodine 125, Argon 41 or Tritium. An assessment of the operating history of the facility indicates that it consistently maintained such exposures to levels within regulatory limits. This will be discussed later by Mr. Martin.

To minimize potential risk -- potential public exposures from normal operation or accidental releases, a robust containment building has been constructed around the reactor, its equipment and facilities. Access to this containment building is always through an airlock with double doors. Atmospheric releases from this building are always filtered to minimize radioactive releases to the environment.

Small amounts of radioactive waste are produced at MNR. High level solid waste, which is spent fuel, is shipped back to the USA according to an agreement with the US Department

of Energy. Other low and medium level solid waste is packed and shipped to Chalk River Laboratories waste management areas. MNR retains all liquid waste for processing through filters and then testing it for acceptability prior to releasing it to the sewer system.

Other hazardous chemicals are disposed off through the university's hazardous waste program.

I will now turn the rest of the presentation over to Mr. Martin.

MR. MARTIN: Good afternoon, Madam Chair and Members of the Commission.

For the record, my name is Glenn Martin and I'm Head of the Operational Facilities Licensing Section of the Research and Production Facilities Division.

This part of the presentation begins with a summary of regulatory activities related to: health, safety and the environment; the operating performance of the McMaster Nuclear Reactor; and transition issues associated with implementation of the Nuclear Safety and Control Act and Regulations.

The first regulatory activity is

the protection of health, safety and the environment. The first topic is staff's compliance verification activities at the McMaster Nuclear Reactor.

The most recent staff compliance inspection was in the fall of 2001. The inspection led to only two recommendations that McMaster staff addressed properly and promptly.

Another item is the doses to workers at the McMaster Nuclear Reactor. Trending of average external doses for the last five years that complete data are available for is presented in the next slide.

This slide shows that the average annual effective doses to workers at the reactor are well within the regulatory limit of 50 millisieverts for a calendar year. There is also a general downward trend as the result of a review of worker doses that McMaster initiated itself.

The apparent inconsistency in the downward trend in 1999 is due to a fluctuation in operations activities that year compared to 1998 and has no adverse health and safety implications. The "apparent increase" in 1999 also seems more significant because of the decrease in 2000 due to

installation of a make-up source of reactor pool water on the experimental floor.

This change reduced the amount of time that operations staff spend in the pump room, where radiation dose rates are higher.

The maximum annual effective dose to a worker during the 5 year period shown in the bar chart was 10.4 millisieverts in 1996. This is also within the annual regulatory limits for a calendar year.

This next slide shows the average iodine-125 airborne releases to the environment for the last three years that complete data are available for. The result for 2000 was about 0.0003 per cent of the Derived Emission Limit for iodine-125 and continued the downward trend of the two previous years. For 1999 and 2000, doses to the general public at the boundary of the facility due to airborne releases were estimated to be about 0.05 per cent of the regulatory limit for a member of the public, which is 1 millisievert for a calendar year.

For 1999 and 2000, the maximum doses due to airborne releases to a member of the critical group were estimated to be about 0.01 per

cent of the regulatory limit for a member of the public. These doses differ from estimated doses to the general public at the facility boundary because the critical group is located farther from the reactor than the boundary of the facility.

In 1997, CNSC staff evaluated the Emissions and Environmental Monitoring Program and identified eight action notices and three recommendations for improving weaknesses in the program. Three of the action notices, mostly related to procedure writing, and one recommendation remain open. McMaster staff has indicated recently that the three action notices will be addressed by December 2002.

Since progress on these items has been slower than anticipated, staff recommends licence condition 10.1(a) to ensure that McMaster staff responds to the remaining action notices by December 31st 2002 as they have committed to do.

McMaster submitted a revised Derived Emission Limits document for CNSC staff's approval. Staff provided review comments. Recent communication from McMaster indicates that closure of this issue is imminent. Hence, staff recommends deleting proposed licence condition

10.1(b) that was to ensure an acceptable Derived Emission Limits document would be in place by December 31st 2002.

This condition is no longer needed as McMaster expects to submit the revised document in March 2002. Staff will update the Commission on this issue on day 2 of this Hearing.

The Safety Analysis Report for the McMaster Nuclear Reactor is being revised. Its first draft was delivered for CNSC staff review this morning.

McMaster staff is preparing a Preliminary Decommissioning Plan, based on a previously submitted conceptual decommissioning plan and CNSC guidance documents. McMaster staff now expects to submit this plan in March 2002.

McMaster University is currently reviewing its Emergency Preparedness Plan for the reactor. An action plan for revising the Emergency Preparedness Plan will be submitted to staff by May 31st with a view to submitting the revised plan by December 31st. This schedule is acceptable to staff and staff plans to evaluate the revised Emergency Preparedness Plan in 2003.

The second regulatory activity is the reactor's operating performance during the current licence period. The facility has been operated safely throughout the period. All doses to workers and releases to the environment were well within regulatory limits. There have been no unplanned events.

During the current licence period, all refuelling was conducted without incident. However, during one refuelling operation that CNSC staff observed, staff noted some radiation protection practices need to be improved. Staff plans to conduct formal audits of the refuelling process as well as the Radiation Protection Program during the next licence period.

Staff reviewed a draft Configuration Control Program document and concluded it requires improvement to be fully effective. To ensure timely implementation of an acceptable Configuration Control Program, staff proposes licence condition 10.1(c) requiring this issue be addressed by December 31st 2002. In the interim, McMaster has committed not to undertake any changes to safety systems.

A staff review of some reactor

procedures concluded that their format needs improving. McMaster staff committed to develop a procedures format acceptable to CNSC staff and to systematically convert the reactor's approximately 300 procedures to the new format over the next few years as each procedure reaches its scheduled review date.

Consequently, CNSC staff recommends modifying the proposed licence condition 10.1(d) which, as written, requires the reformatting of all reactor procedures by December 31st, 2002. Instead, staff recommends that the licence condition require McMaster to have in place an acceptable procedures format by December 31st 2002. The new version of proposed licence condition 10.1(d) will be described later under quality assurance.

I will now update the Commission on the status of four issues related to the transition to the Nuclear Safety and Control Act and Regulations. The first issue is related to action levels.

Staff has accepted McMaster's proposed action levels for worker exposures. Other action levels for such parameters as

radionuclide discharge rates and surface contamination levels are still being discussed. Once all action levels are finalized, a relevant licence condition will be added to the proposed licence. Staff will update the Commission on this issue on Day Two of this hearing.

The second issue is the Training Program for operations staff. Staff reviewed several training program documents and concludes these documents represent a significant step in defining an adequate training program for operations staff. However, the review identified some areas where more information or clarification is required and staff is pursuing this issue with McMaster University staff.

Staff's position is that reasonable progress has been achieved for both issues. Hence, staff does not propose any specific licence conditions as closure of both issues is anticipated shortly.

The third issue is Quality Assurance. A quality assurance policy and about 300 supporting procedures have been developed for the McMaster Nuclear Reactor. Staff concludes that the reactor's Policy Manual addresses the

major elements of a quality assurance program and provides an adequate framework for developing any required supporting procedures.

Proposed licence condition 10.1(d) would require McMaster to consolidate by December 31st 2002, all the existing documents into a quality assurance program, taking into account modifications to the Policy Manual already requested by CNSC staff. As indicated earlier, staff no longer recommends the proposed licence condition 10.1(d) require the reformatting of all 300 procedures by December 31st. Staff now recommends that the condition read as follows.

> "The licensee shall, no later than December 31, 2002, submit a consolidated Quality Assurance Program, acceptable to the Commission or a person authorized by the Commission, based on McMaster Nuclear Reactor Policy Manual AP-1000 and its supporting procedures, and submit a guide for reformatting the supporting procedures,

acceptable to the Commission or a person authorized by the Commission."

The fourth transition issue is financial guarantees for the decommissioning plan. McMaster University has made provisions for a decommissioning fund for several years. As indicated earlier, a revised preliminary decommissioning plan that meets current regulatory requirements will be submitted by the end of March, 2002. CNSC staff and McMaster staff continue to discuss this issue; however, if progress is not significant and timely, staff may recommend adding a licence condition about financial guarantees. Staff will update the Commission regarding this issue on Day Two of this hearing.

The next topic is nuclear security. The most recent security compliance audit in September 2000 led to two recommendations that were suitably addressed in a timely manner. Staff also assessed a revised security report, which was submitted last November, and concluded the report satisfies the Nuclear Security Regulations.

On November 16th last year, Designated Officer Order #O1-D1 was issued to certain licensees, including McMaster University, to upgrade physical security at nuclear facilities. When the Order was issued, McMaster was already complying with some of its requirements. McMaster University is also making reasonable progress on fully implementing all the requirements of the Order on schedule.

Therefore, staff concludes that nuclear security at the McMaster Nuclear Reactor is acceptable. CNSC security advisors plan to inspect the reactor in early April to assess continued compliance with the Order and the Nuclear Security Regulations.

The final topic is application of the Canadian Environmental Assessment Act to this licence application.

The proposed licence is being considered for renewal under section 24 of the Nuclear Safety and Control Act, which is considered equivalent to renewing an operating licence under section 9 of the Atomic Energy Control Regulations, for the purposes of the Canadian Environmental Assessment Act.

Since such a licence renewal is not prescribed in the Law List Regulations, which are under the Canadian Environmental Assessment Act, a federal environmental assessment is not required to renew the operating licence for the McMaster Nuclear Reactor.

I shall now present staff's conclusions on McMaster's application to renew the operating licence for the nuclear reactor.

Staff concludes that the applicant satisfies the conditions for issuance of a licence set out in subsections 24(4)(a) and (b) of the Nuclear Safety and Control Act; and the risks that operation of the reactor poses to the environment, to the health and safety of persons and to national security are not significant, taking into account the measures and programs already in place to control the facility hazards.

Based on these conclusions, staff recommends that the Commission accept staff's assessment that the applicant meets the conditions for issuance of a licence set out in the Nuclear Safety and Control Act; accept staff's conclusion that a federal environmental assessment under the Canadian Environmental Assessment Act is not

required, consider issuing the proposed non-power reactor operator licence for a period of five years instead of the current period of three years based on the reasons given in CMD 02-H7 for recommending this licence period and on staff's commitment to prepare a status report at the midpoint of the five year licence period for presentation at a public proceeding of the Commission; and accept staff's recommendation to add three licence conditions to ensure the applicant addresses some outstanding licensing issues by December 31st 2002.

This completes staff's presentation on McMaster University's application to renew the operating licence for the McMaster Nuclear Reactor. Staff is now available to answer any questions Commission members may have.

THE CHAIRPERSON: Thank you very much.

Before I open the floor for questions, I would just like to remind everyone of a comment that I made earlier in the day that some of your may not have been here, and that is with regards to the fact that the Commission is still on the enhanced security status and that there are

several security-related issues which have been raised today.

As such, I will take measures to ensure that any security matters of a sensitive nature are not discussed in public and, if necessary, we will move in camera to discuss security-related matters.

With that, I do open the floor for questions from the Commission Members.

Dr. Barnes.

MEMBER BARNES: I had a series of questions, but they are fairly short so I might take a break or the Chair will break me off.

To McMaster, just out of interest, what is the anticipated life of this reactor?

MR. HEYSEL: Currently with the formation of McIARS I think, in my estimation, at least 10 years of operation is achievable from the existing facility. This includes the results of our major equipment review.

MEMBER BARNES: A further 10 years from now?

MR. HEYSEL: That is correct.

MEMBER BARNES: I will just take my questions sort of through your presentation.

I was interested in your organizational chart. That was on page 7 of your presentation. Do you have a Deputy Director? You have a fairly flat chart, which these days is considered probably good. On the other hand, a Director can get overloaded if it is too flat. Do you have someone who essentially substitutes for you on a fairly regular basis?

MR. HEYSEL: No, I do not. The various facility managers would be deputies for their particular facility.

MEMBER BARNES: You mentioned that you had an infusion of $10 million for your new initiative there, correct, in the McIARS?

MR. HEYSEL: That is correct. There has been quite a sizeable investment for the institute, part of which is directed towards the reactor.

MEMBER BARNES: I was interested to know whether OPG was part of that investment.

MR. HEYSEL: I think I will turn that question over to Mamdouh Shoukri.

DR. SHOUKRI: For the record, my name is Mamdouh Shoukri. I am the Vice-President, Research and International Relations, McMaster

University.

We have made a commitment to the area of nuclear sciences and engineering. As such, we have created this new institute of Applied Radiation Sciences. The institute received in the last couple of years both CFI and ORDCF awards, a total of $10 million. It involved also a couple of faculty positions, so being filled as a result of this.

This is the $10 million Mr. Heysel was talking about.

Over and above that, we have also made a commitment, in fact McMaster championed the cause of new education and research in nuclear engineering and sciences on Canadian campuses. We are in the early stages of completing an agreement -- actually in the final stages of completing an agreement with OPG, Bruce Power and AECL to create five new research chairs in five Canadian universities and to have a significant amount of research funding to support these new positions and to create new graduate program in nuclear sciences and engineering on these five campuses.

We hope that this network, which

will be led by McMaster University, will expand to include other universities as well.

This actually relates to earlier questions to Mr. Heysel about our commitment to the reactor and how long we see it.

The Institute of Applied Radiation Sciences is very closely tied to the reactor, and therefore we see the reactor as being an important component in this plan. The education and research part by these new faculty members and their expanded activities in nuclear sciences and engineering will certainly benefit from the nuclear reactor and help continue the operation of the nuclear reactors.

So this is the bigger picture.

This $10 million related to the Institute of Applied Radiation Sciences only. The OPG, Bruce Power, AECL plan, the plan is about -- including the matching funding that we hope to secure -- will be in the order of $23 million that will be shared by five universities.

MEMBER BARNES: Twenty-three million?

DR. SHOUKRI: Yes, that will be shared by five universities.

MEMBER BARNES: Over what period of time?

DR. SHOUKRI: Over a period of five years.

MEMBER BARNES: Okay. That is very pleasing to hear because we have obviously met with OPG on a number of occasions and other utilities and have heard their concerns about the long-term supply of people adequately trained in this sort of area. So that is good to hear.

Could I also ask how you have acquired the budget for a 25 per cent staff increase and where, but in general, and where are those staff being positioned in this structure. Is that just part of the overall expansion or is it targeted?

MR. HEYSEL: Chris Heysel, for the record.

Having a small staff a 25 per cent increase isn't too hard to achieve.

The significant staff changes we have made is really on the supervisory level. We have budgeted for three supervisors, two of which are hired. The third one we are in an interviewing stage.

The focus of each of these supervisors, one will be on physics and core management for the reactor, sort of a nuclear physicist for the reactor.

A second, Rob Pasuta who is here today, will be focused on operations, engineering.

A third, which we hope to hire over the next couple of months, will be focused on training and documentation, so to carry forward on our commitment to our training program.

We have also hired an additional -- we have budget for an additional administration staff to carry the increased workload that comes with a bigger staff, but that has been the real focus on our staff. It is right in the operations group.

MEMBER BARNES: Do you want me to stop there for a while?

THE CHAIRPERSON: Yes.

MEMBER BARNES: Okay.

THE CHAIRPERSON: Dr. Giroux.

MEMBER GIROUX: I would like to address first the safety analysis report that you have mentioned. You state that you derived it from basic principles. I think I would like to

hear two things from you.

One, what are the main principles that you are working with to build your analysis?

Two, what are the worst case scenarios. What was the worst accident that you are postulating?

MR. HEYSEL: Again for the record my name is Chris Heysel.

The basis of our safety analysis report was based on an IAEA draft guideline for a small research reactor. So our safety objectives were derived from this report.

The analysis looked at different initiating events. Basically we used categorization that other small Canadian research reactors have used, or small Canadian reactors I should say. So we derived our categorization of initiating events from information that the CNSC staff was familiar with.

The worst case event -- the other thing I should note is that we did not cut off at 10 to the minus 6. We went into severe accident rare events, so our safety analysis report is quite different from other ones that have been prepared recently.

I think the worst case event that we analyzed, the one closest to the 10 to the minus 6 cutoff that we spent most of our effort on understanding fully was flow blockage. So we spent probably 25 per cent of our effort investigating the initiating events around flow blockage, defining them. Even through that analysis we noted that the dose to the population was well below the limits prescribed in the aforementioned IAEA document.

MEMBER GIROUX: Are you talking about blockage of the cooling water going through the core? Is that what you are referring to, that it might become stagnant and --

MR. HEYSEL: It actually had to do with a foreign object being introduced into the pool and landing in a certain geometry that would escape recognition by our shutdown systems and then cause fuel damage.

MEMBER GIROUX: Thank you.

The second question is concerning the containment building. You stated you have a robust containment building. Does that mean that it is able to take pressure from inside if there is a malfunction? If so, how much pressure can it

take and can you relate it to containment for nuclear reactor or CANDU reactor for instance?

MR. HEYSEL: We have looked at that.

Maybe I could ask Charles Blahnik to answer that. He has the most experience with the CANDU containment.

If Charles is available I would ask him to answer that question.

MR. BLAHNIK: Charles Blahnik, for the record.

The McMaster containment building was designed to half a PSI pressure, which was derived from destructive experiments, cores being blown apart in the early '50s.

This pressure may seem to be low. On the other hand, you must appreciate that there is no high-pressure steam, high-pressure fluid. We have assessed suitability of this containment to fully uncovering the core and long-term steaming and the containment is performing very well.

Does that answer your question?

MEMBER GIROUX: Could you repeat what you first said. What is the number of the

pressure?

MR. BLAHNIK: Half a PSI. It is equivalent to 60 pounds of steam and it is produced -- this number is based on a series of experimental explosions that were performed in the '50s and '60s where they blew this type of reactor apart. So it can take that type of --

THE CHAIRPERSON: Ms MacLachlan.

MEMBER MacLACHLAN: Thank you. This is a question to McMaster.

On page 17 of your submission when you are discussing the decommissioning plan you state that:

> "Provisions for a decommissioning fund have been made on an ongoing basis for a number of years at the university and represent a significant fraction of the current operating budget."

Do I take it from that statement that there is already money set aside for decommissioning of the reactor?

MR. HEYSEL: You are correct. We don't have the full amount covered yet. We are

about, I would say, 33 per cent of the way there, about a third of the way there.

One of the interesting strategies that my predecessor undertook was to recognize the eventual decommissioning and to put money aside. It is structured so that for every fuel we put into the core we put away the money to dispose of it. So certainly all the fuel is taken care of as we use it.

On top of that, a sizeable amount of our budget -- I don't want to quote numbers, but certainly in excess of 10 per cent of my operating budget goes to this fund. So I think we have been responsible and proactive.

The issue in front of us is to find the money for the entire decommissioning, but we had recognized it as a proactive thing to do earlier in the history and have been quite responsible in putting money away. So there is over $3 million put aside and I think the numbers that we did in today's dollars is about $10 million.

That includes a 35 per cent contingency. So the actual number in front of us is about $8 million. With contingency it is just

over $10 million and we have in the order of $3 million -- in excess of $3 million in the account, in the budget, or in a separate fund for decommissioning.

MEMBER MacLACHLAN: Thank you. I do have another question but I am tempted to ask a question about your role on another application. Maybe I shouldn't say that.

This is a question for staff.

Throughout the CMD there were a number of places where it was noted that there were action notices, a number of action notices and a number of recommendations. Collectively that seems to be at least 16 action notices and six recommendations. Is that correct?

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

DR. ALY: Actually this is correct, but this is over quite a number of years. It goes back to 1997.

MEMBER MacLACHLAN: Nineteen ninety-seven?

DR. ALY: Yes.

MEMBER MacLACHLAN: Okay. But there are four action notices remaining open?

DR. ALY: That is correct, and these are related to procedure writing and we anticipate that this will be closed by June this year, according to McMaster staff.

MEMBER MacLACHLAN: Right. Okay. So this is primarily documentation preparation?

DR. ALY: Correct, yes.

MEMBER MacLACHLAN: Are the procedures represented by those documents in place?

DR. ALY: There are procedures in place, it is just a matter of reformatting to make them more user friendly.

MEMBER MacLACHLAN: Okay. Thank you.

A question to McMaster then. Is some of the increase in the staff that you have being allocated to preparation of this documentation?

MR. HEYSEL: That is correct. The supervisor position that we are hiring for right now, the title is Training and Documentation, so it is to help us move quicker on some of the documentation issues.

But again to reiterate, it is

basically writing down what we are actually doing. So it is not to change behaviour at the facility, but to document it better.

MEMBER MacLACHLAN: Thank you.

THE CHAIRPERSON: Mr. Graham.

MEMBER GRAHAM: Yes, thank you.

I had some questions that I think have already been answered by your presentation this afternoon and I believe you have done a very good job with your other presentation, but I do have a few questions I would like to follow up on.

The facility goes back when it was originally constructed in 1959, which would be 43 years, and in a reactor of that age is there metal fatigue, and so on, that you have to replace certain things -- and I ask this to CNSC staff really.

What is the procedure of a reactor -- I mean we are talking at least another 10 years so it will be a half a century old. Are there certain things that have to be replaced through metal fatigue, and so on, that need still to be done to maintain the next 10 years?

MR. HOWDEN: I will ask Dr. Aly to respond to that.

DR. ALY: At McMaster University they have an active management of ageING program and they look after that aspect on an ongoing basis. They have already mentioned in their presentation they changed a number of important systems like the cooling towers and some other equipment. The next major change is the control system itself.

In terms of piping, the reactor operates at a very low pressure because it is an open pool system and I am quite sure that inspection of piping leading from the holding tank to the reactor is subject to that inspection.

MEMBER GRAHAM: So you wouldn't have the same problems as Point Lepreau has been having, and so on, with regard to pipe stress, stress on pipes and so on. You wouldn't have that because of the low pressure?

DR. ALY: We don't believe so. It is low pressure, low temperature.

MEMBER GRAHAM: On page 3 of the original document they listed a group of administrative framework, safety MNR regulatory requirements that they were proceeding with. Are these in concurrence and, CNSC staff, are you in

agreement that these are the top priorities?

DR. ALY: Yes, we are in agreement with that.

MEMBER GRAHAM: No other ones that should be added?

DR. ALY: The additional requirements, we included that in the licence condition like the configuration management document and the quality assurance program.

MEMBER GRAHAM: A question back on page 2 with regard to the radiation levels and the exhaust stack and the airlock system equipment, the airlock system.

Has that airlock system ever had to be activated, not just for training or for testing, but has it ever had to be activated because of a problem within the reactor?

MR. HEYSEL: Chris Heysel, for the record.

Not to my knowledge, but I will ask Mike Butler. The manager of the reactor is much more experienced than me to supplement my answer.

MR. BUTLER: For the record, Mike Butler, Reactor Operations.

To the best of my knowledge this system has been tested once in the very early '60s when a radiated sample turned out to be not what the researcher claimed it was and it was destroyed during the irradiation and caused a release of fission products which activated the system. But that was -- I'm not quite sure how to describe that, except to say it was not something done in accordance with what we expected.

MEMBER GRAHAM: Again, you are saying that was back in the '60s. So there hasn't been any recent incident?

Okay. Thank you.

Emergency preparedness, with regard to that -- and I believe it is on page 10 that you talk about emergency preparedness.

Emergency Preparedness -- I think that is what they are called, or EMO, Ontario Emergency Preparedness, do they work with you with regard to emergency preparedness plans with your reactor the same as they do with OPG, and do they have a plan?

MR. HEYSEL: One of the things we do at McMaster is we hold an annual review of our emergency preparedness plan. We basically do a

table top with both internal and external members that are police, fire, and public health department.

EMO is invited to those meetings. Although they didn't attend this year's meeting, they have attended previous meetings. They also are involved certainly with the City of Hamilton plans and they do sit on the same committee that I sit on. So they are involved. They do submit comments on our plans.

We haven't been contacted by them since the new plan that they have brought out has come into play. I don't know -- Dave Tucker may be able to expand on that. I know he has communicated with them, I have not. So maybe I will ask Dave to provide more information on that subject.

MR. TUCKER: Dave Tucker, for the record, Senor Health Physicist for McMaster University.

I am in touch with staff from Emergency Measures Ontario. We are covered under Part VIII of the Province of Ontario's Nuclear Emergency Plan which is a generic part of that plan. So we do not have a specific appendix that

applies to us as the OPG sites do.

But our emergency plan is fully consistent with the requirements of Part VIII of the Plan that applies to us.

MEMBER GRAHAM: My question would be: Are you satisfied that the working relationship is sufficient to meet any, not catastrophe, I don't want to say it, but any occasion that may arise that needs addressing. Have you a good understanding and working relationship with them?

MR. TUCKER: Yes, we do. We have a very good working relationship with them.

MEMBER GRAHAM: The other question I was going to ask was with regard to hazardous materials, but I understand that reading further that that all goes to Chalk River, all of your disposal of materials, other than the radioactive.

MR. HEYSEL: Other than the fuel. The fuel goes to the U.S. All other radioactive material goes to Chalk River.

THE CHAIRPERSON: Dr. Barnes.

MEMBER BARNES: Some new, and some just to follow up. On the decommissioning, how much are you setting aside this year or next year

towards decommissioning?

MR. HEYSEL: Excuse me. Chris Heysel for the record.

Mamdouh just pointed out that I have submitted three years worth of budget and it indicates in the order of $500,000 to $600,000 a year. So for my relatively small operating budget that again is quite a significant figure for us.

MEMBER BARNES: I just want to make sure that the amount was accumulated in the ten years that you had predicted was available.

On page 11, which is the maintenance and testing, you give a table of the major piece of equipment, the date, the inspection results, and so on. Just the first one which is the Rector Structure and Seismic Analysis, 1990. That's the first in there.

That was done to certain CSA standards. Have those standards changed over the last decade?

--- Pause

MEMBER BARNES: I could ask it in a slightly different way. When would you anticipate another such analysis, or would you?

MR. HEYSEL: It's a good question.

I would have to -- for the record, Chris Heysel. I will review the standards. I am not exactly sure of the date, but it's something I will supply the Commission with for the next meeting.

MEMBER BARNES: Maybe a question to staff, and I refer on page 18 of McMaster's submission in which they detail a number of issues like the health physics, the effluent and environmental monitoring and the configuration management. These tend to suggest certain kinds of actions identified in 1999 and just to my eye it seems in all three of those to take three or four years to implement.

Is this to be expected given the nature of them, or am I to interpret this as being maybe a slightly sluggish management structure that has difficulty responding quickly to some of these issues?

MR. HOWDEN: Dr. Aly will respond.

DR. ALY: I would like to point out that during the past four or five years I have had 100 per cent turnover of staff in this group. Three staff retired and someone left, and during this period when we engaged new staff we assigned our licensing activities based on the risk of the

facilities and more so, therefore, went to Chalk River and Whiteshell facilities and we caught on that late.

So I agree with you that there was some gap between the time of receiving the information and us going back to the university. It was staffing issues essentially.

MEMBER BARNES: It wasn't just the Commission staff. I was also thinking of the time it takes for McMaster to implement these. Were you happy in the way that in those three examples that McMaster responded, or do you find that overall there is a certain sluggishness in their response to implementing some of these?

DR. ALY: Where the response was sluggish, we recommended the licence conditions to take care of that, and that is essentially the cases where they took more than what we expected them to take.

MEMBER BARNES: Okay. Just a couple of updates, if I may, to McMaster now. Actually, I guess they are figured in the Commission's paper and this is the average external dose trend. I wondered since the last one was 2000 and we are certainly into 2002 now,

do you have any information on the trend in 2001? These are the figures on pages 7 and 8 of the Commission's report, those histograms, Average External Dose Trend, 1996 to 2000.

--- Pause

MEMBER BARNES: The point here in part is these data were used as evidence of a downward trend, but in fact in 1996, 1997, 1999 they were pretty much the same and you indicated the dip in 1998 was because of operating at lower levels. So I would say that four of those five years are more or less the same. In 2000, there certainly was a dip. Do you have any information on 2001 to suggest that the trend really is down or whether it has bobbed back up again?

MR. TUCKER: Dave Tucker from McMaster University. We are awaiting the fourth quarter of 2001, the dosimetry data now, but based on our projection there will be a slight decrease in the collective dose for the operations staff for 2001 versus 2000.

MEMBER BARNES: And I wondered, in the next one which was the average exhaust concentrations why that was just limited to three years. You are giving data on the other one which

are five years. We have some of the data that is arguing that the same sort of case, but it's only based on a three-year --

THE CHAIRPERSON: I believe that is a CNSC document.

MEMBER BARNES: It's the next page, but I assume that the data is from McMaster.

DR. ALY: Aly Aly again for the record. The iodine 125 production at McMaster started only lately. This was not a process that they used to do in the past. We provided approval for McMaster to produce iodine in the late '90s. So this reflects the period for which there was production of iodine 125.

MEMBER BARNES: Maybe one final question, Madam Chair.

Again to staff. On page 13 of your document where you are essentially proposing to drop the licence condition 10.1(d), and replace it with that section that was in italics.

10.1(d), it seems to me that it was quite specific in requiring the formatting of all 300 procedures, and I can see it might be a little onerous, but nevertheless one is trying to get from A to B by a specified date. The wording

here is that by that same date what you require is for McMaster to submit a guide for reformatting the supporting procedures.

It seems to me a rather different task. One is simply a guide and the other is they have actually done it. Could you --

DR. ALY: In answer to that, our quality assurance specialists are of the opinion that the current procedures, in addition to the policy manual together, will provide an acceptable quality assurance program that we are looking for.

Reformatting the procedure was an action placed by our human factors specialists and when we wrote this condition initially we underestimated the amount of work required to reformat all these procedures. In further communication with McMaster staff we were told that even from a human factor perspective this could have a negative impact on the operation. So we have to go at it a little bit slower, but in terms of quality assurance program, they have already the procedures and the policy manual. So this will provide the QA program we are looking for. Reformatting to improve the human factors aspects could be done on a longer time period. So

this was an oversight on our part.

MEMBER BARNES: If I could maybe ask McMaster then, if we approve the recommendation here of staff to go along with that, by the end of this year you will have the guide to reformatting. You have your QA, you have many of the procedures. How long would it take to actually put that QA into reality?

MR. HEYSEL: For the record Chris Heysel. I see it as almost two separate issues in my mind. I think reformatting the procedures, I would concede that. If I were to start up a new reactor I would choose a different format for my procedures. I think that's a given.

What I am sensitive to is that the procedures that staff use, have used for a while, it's part of their culture and to overnight change the layout and the way they read procedures could have a negative safety impact.

So I see the 300 procedures, we do have a schedule for review and update of those procedures, and it makes good sense to me that during the scheduled review and update we would introduce the new format.

We have to come to some consensus

on what is an acceptable format, but I don't see that as a big issue. That's just getting together and talking.

The QA program. Currently the QA program is imbedded in our management and administration policy. So if I understand the staff condition correctly, they would like us to rewrite our existing management policy procedure to reflect a consolidated QA program, and if that's my interpretation, then the end of the year this year would be achievable for that. If it's a standalone document then I would question the time frame for that.

MEMBER BARNES: I am trying to get at the difference between setting up a program where you define the quality assurance issues versus actually having your staff work to that program. I mean, you use the word culture, safety culture and your staff, and we have heard that again by other larger institutions, particularly OPG and so on, the difficulty of actually changing the culture when you want to implement a new set of procedures here.

So my question was: If you can get the QA procedures and formatting, let's say by

the end of the year, how long do you think it would take to sort of properly change the culture to get it fully operational?

MR. HEYSEL: Again Chris Heysel, McMaster. I think the culture is there, I would say. That's something I would stand behind. The QA programs in place at McMaster right now are adequate. It's just the strategy we have taken to demonstrate QA at the facility.

We have incorporated it into our administration and management policies and programs which has to date been a successful and acceptable strategy for the reactor to take. CNSC staff, I believe, would like to see a separate document as opposed to integrate it in our management policies. So the QA is there and is ongoing. It would be to bring those relevant elements out of our management policy and put it in a standalone document.

So QA is in place and is existing to put in a separate document as issue one. The reformatting of the procedures, again, is more of a human factors initiative and not a QA one. I see them again as separate issues, but I would certainly want to put on the record that QA at the

reactor is in place currently.

THE CHAIRPERSON: Dr. Giroux.

MEMBER GIROUX: Briefly. I would like to come back to the question of the waste. I read in your document that you have some high-level waste that you store permanently in the pool. Is that correct? The fuel you send to the U.S. and the low-level you send to Chalk River, but you store some permanently. My question is about the volume that that corresponds to and the space you have for accumulating that sort of waste.

MR. HEYSEL: You are correct. There are some high-level waste, but it has to do with components of the reactor. So they are in a pool insomuch that there is cubic metres of them, no more than that. Maybe Mike would like to add, but we are not talking about large volumes. It's quite small volumes of activated components.

MEMBER GIROUX: And you could continue adding to them for at least the ten years that you are considering?

MR. HEYSEL: Certainly a couple cubic metres over 40 years would project forward. It won't cause us a problem, given the size of

our pool.

MEMBER GIROUX: Thank you.

The other question concerns decommissioning. We have heard your answers and the reserves you make over here, but there is still a shortfall there. The obvious assumption is that the university is the licensee and the owner, and if you had to decommission and you don't have the full funds, the university would be called up to supply them.

Do we understand from Dr. Shoukri nodding that there is a commitment from the university to take care of decommissioning whether it happens in terms of the reserves?

DR. SHOUKRI: There is no question about that. We are totally committed to that.

THE CHAIRPERSON: Mr. Graham.

MEMBER GRAHAM: That was along the line that I was going to ask, but we all hear every day of the limited funds universities have, and I am not going to get into the decommissioning, but you have an aggressive program, regardless of how many staff you are increasing, it's still a 25 per cent increase in that part of your budget.

You have a $600,000 to $700,000 dollars a year you are setting aside for reserves for decommissioning, and on page 16 you have some ongoing equipment upgrades which are relatively large, or they seem to be relatively large.

My question is: Do you have any cost recovery from other outside sources, or do you depend pretty well solely on the university for all of the funding, including capital?

MR. HEYSEL: We certainly rely on capital from the university, and the university makes a significant contribution no doubt to our operating budget. We do recover some costs from activation analysis and also, as mentioned, we do produce iodine 125 which we sell for use in prostate cancer therapy.

So we do recover some of the costs, but certainly we couldn't do it without the university's backing.

THE CHAIRPERSON: I have just two questions. One is with regards to the staff. The staff are represented by a union at the university. Are they? And do you have a joint health committee with them, and how does this process take place with regards to consultation

with them and their involvement?

MR. HEYSEL: Chris Heysel for the record. I will turn that over to Dave Tucker. He is much more familiar with the unions on campus.

MR. TUCKER: Dave Tucker from McMaster. The majority of the staff are covered -- those that are unionized in this environment are covered by the McMaster University Staff Association. It is a certified bargaining unit. There is a central Joint Health and Safety Committee for the university that has representatives from management and from each of the unions that are operating on campus, including the McMaster University Staff Association.

Then there are other local Joint Health and Safety Committees focused on smaller areas of the campus.

THE CHAIRPERSON: Do you have a meeting scheduled for the Joint Health Committee for this facility, or how is that done?

MR. HEYSEL: There is not a specific joint committee operating within the reactor. There is one for the campus as a whole. It meets -- I believe, it's every month that that committee meets.

THE CHAIRPERSON: Could you confirm that by Day 2?

MR. HEYSEL: I can certainly confirm by Day 2 and I should note I am an ex-officio member of that committee as well. So I attend the committee meetings to address any issues of radiation safety.

THE CHAIRPERSON: My second question is with regards to a public information plan, and whatever we require, that there is an ongoing relationship between our licensees and the public, be that within the campus in your case, or broadly.

Is there a program? It may vary before or after the security order, so I appreciate that and I would like you to use care in talking about that. But what is the involvement of this facility in terms of describing what it does or being able to answer questions from the public, et cetera?

MR. HEYSEL: Chris Heysel for McMaster.

Certainly prior to September 11th we had quite an open door policy for the reactor and we actually went out and encouraged students

from other campuses as well as high school students. We were very interested in getting them into our facility and getting them to have a familiarity with nuclear science and the benefits it can provide to mankind.

So we were proactive on the public tour perspective. We do have a public affairs office on campus, which gives information to the public on a required basis. We answer all e-mails and telephone calls that are submitted to us. We publicly -- we have a website that is up that allows -- that gives information about our facility. I believe the -- I am trying to get the university term.

--- Pause

MR. HEYSEL: The university calendar has a description of the reactor in it and the ongoing research and educational programs reflected around that. There is open houses at the university again, prior to 9-11 the reactor was an active participant in it.

So in some ways, September 11th has set us back in that we certainly actively promote nuclear energy in its application in Canada. So we try to be as proactive as possible.

THE CHAIRPERSON: It may very well be that we are all going to have to re-examine how we look at public information or we won't have tours or whatever.

Thank you very much.

Ms MacLachlan.

MEMBER McLACHLAN: I guess this is a question for McMaster University. You were speaking to us earlier about how you had been proactive in setting aside money for decommissioning and you are working on a decommissioning plan. We heard earlier this morning in an application by TRIUMF that McMaster is a participant in the TRIUMF project, and we also heard this morning that they have a projected lifespan of ten plus a bit years. And you have also said that your reactor has a projected life of approximately ten years.

There is the possibility that the decommissioning of both facilities could occur within a short period of time of each other. Is this a foreseeable event by McMaster and is it possible to handle both financial commitments at the same or in the same range of time?

MR. HEYSEL: Just briefly I should

clarify my words. It's a minimum of ten years so I don't want to send a message or put a date on it. I can turn the question over to Mamdouh or Dr. Shoukri who has a better feel for the financial assets of the university.

MEMBER McLACHLAN: Thank you.

THE CHAIRPERSON: And I just would like to make it clear that we have finished the TRIUMF hearing so it is not a TRIUMF hearing we are just talking about. It is the joint issues.

DR. SHOUKRI: Well, with the investment we are making that are very relevant to the existence of the nuclear reactor at McMaster campus, frankly, I think if we know it's ten years we wouldn't have gone that far in terms of all of these investments that we are making. So I believe it will be more than ten years, significantly more than ten years.

As to the question, the probability as I'm sure you agree of having the two reactors being decommissioned at the same time is extremely low. That said, we only participate as one of a significant number of partners in the TRIUMF facility. So we don't -- McMaster will not have to worry about commissioning of two reactors.

Maybe 1.2 reactors.

That said also, let's also look at some facts here. I understand very well the objective is to ensure that the public is not left with a financial liability. I think the risk to the public is infinitesimally small. We are an institution that has an operating budget this year that is in excess of $200 million and our total research funding last year was 106, over a hundred million dollars.

So for an institution that had an income last year of a total of over $300 million it is not that difficult to come up with the balance to finish our, to decommission our reactor and pay our small share of the TRIUMF decommissioning. We are an institution with significant resources. Admittedly we are funded through the public purse, the same public purse that we are concerned about. But also the likelihood for an institution like McMaster to go out of business is essentially zero.

So we will be around. We will have significant annual operating budget. We will have significant research budget and I don't believe that this is going to be a major liability

for us to deal with.

THE CHAIRPERSON: This brings to the end the questioning for this hearing. This hearing will continue on the 22nd of May 2002 here in the CNSC offices. The public is invited to participate, either by oral presentation or written submission on Hearing Day Two. Persons who wish to intervene on that day must file submissions by April 22nd 2002. The hearing is now adjourned to the 22nd of May 2002 and thank you very much for coming.

We will now take a ten minute break. It is 1538. We will be back here at 1548 for the next hearing. Thank you.

--- Upon recessing at 3:38 p.m.