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Thursday, March 25, 2010

Chair

Mr. Leon Benoit

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● (0905)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): Good morning, everyone.

We are here today for meeting 5 of our Standing Committee on Natural Resources to study the status of the NRU reactor and the supply of medical isotopes.

We have two panels today, one starting now and one at ten o'clock.

Our witnesses today from Lantheus Medical Imaging are Cyrille Villeneuve, vice-president and general manager, international; and William Jr. Dawes, vice-president, manufacturing and supply chain. Welcome.

We have by video conference from Sherbrooke, as an individual, Eric Turcotte, medical specialist in nuclear medicine, clinical head of the Molecular Imaging Centre of Sherbrooke.

We will go directly to the presentations in the order they are on the notice of the meeting. We'll start with Mr. Villeneuve.

Go ahead, please.

Mr. Cyrille Villeneuve (Vice-President and General Manager, International, Lantheus Medical Imaging): Thank you.

Good morning, honourable members. It is a pleasure to be here today. We are honoured to be invited to present to the committee on this important topic of nuclear medical isotope supply from an industry perspective.

My name is Cyrille Villeneuve, and I am vice-president and general manager for Lantheus. Bill Dawes is with me as the vice-president of manufacturing and supply chain.

In our time here today, I would like to give you a very brief overview of Lantheus Medical Imaging, our operations in Canada, and an update on our perspective on the nuclear medical isotope supply situation and its impact on our customers and the patients they serve. Both Mr. Dawes and I will be available to answer your questions afterwards.

Lantheus Medical Imaging is a global, privately held U.S. company, based in North Billerica, Massachusetts. We specialize in providing medical imaging diagnostic products for heart and vascular disease. The company has been a leader in the nuclear medicine industry for more than 50 years, most recently as a division of Bristol-Myers Squibb.

We brought to market pioneer medical isotope products such as thallium and Cardiolite, both of which are used in nuclear medicine to diagnose patients for cardiovascular disease. We believe they are the leading products serving the field today. Cardiolite is most widely used in cardiac imaging, and is the only technetium-labelled myocardial perfusion that has been used to image more than 40 million patients in the United States alone.

In addition to having ten products on the market, Lantheus has a rich pipeline of cardiovascular imaging agents in development for the detection of coronary artery disease and heart failure, and they are also based on medical isotopes.

Lantheus employs more than 600 employees worldwide. We are a fully integrated company with strong research and development capabilities, world-wide manufacturing facilities, a strong distribution network, and dedicated employees. As a global company, we have operations not only in the U.S. but also in Canada, Puerto Rico, and Australia.

[*Translation*]

In Canada, the head office of Lantheus Medical Imaging is in Montreal. Lantheus employs more than 80 Canadians, including sales and marketing staff, customer service representatives and radiopharmacy staff. Lantheus' international operations are managed from Canada, by Canadian staff.

In addition, Lantheus operates five radiopharmacies in Quebec City, Montreal, Mississauga, Hamilton and Vancouver. At those radiopharmacies, we prepare single doses, injection-ready doses, and we deliver them twice daily to nuclear medicine departments and clinics located near our facilities. We are also currently creating a network of radiopharmacy sites for positron emission tomography or PET, which will allow the distribution of PET products to Canadians.

As you may already know, Lantheus and other manufacturers need medical isotopes called molybdenum-99 in order to produce the daughter isotope called technetium-99m. Technetium-99m is the most used medical isotope in the world. On an annual basis, it makes up 82% of radiopharmaceutical injections used for diagnoses, which is over 18.5 million doses per year. Technetium is a critical component for many medical exams, including cardiac pool scans, brain scans, bone, kidney and various tumour scans.

At Lantheus Medical Imaging, we use technetium in our TechneLite generators. These generators are distributed to hospitals and radiopharmacies as sources of technetium for diagnostic imaging. Technetium is also used with Cardiolite in cardiac imaging, in order to assist in the diagnosis of coronary disease in those who might be suffering from it.

All this to say that a serious and extended shortage of medical isotopes can have serious repercussions on the health and well-being of a great many patients. The fact that the Chalk River NRU reactor has been closed for repair since May 2009 has had a significant impact on our operations and clients in North America.

Lantheus has had the privilege of having a very diversified supply chain, and we are doing everything possible to meet the needs of our clients and the medical community in Canada and the United States given the worldwide shortage of molybdenum-99.

The company has amended its production schedule in order to be ready, upon request, once the supply becomes available. We are working 7 days a week, 24 hours a day, and during holidays, in order to provide technetium generators to our clients. We also have the advantage of having cyclotrons, in the U.S., and we have greatly increased our thallium production so that doctors can have access to an alternative imaging product if they are unable to have access to technetium.

We are working in close cooperation with our clients in order to advise them of current and short-term supply, through direct communication and updates that we publish on our website. Furthermore, we are in almost constant contact with our customers and the medical community on the issue of logistics and distribution.

A number of nuclear medicine departments have amended their schedule, in order to maximize the quantity of technetium that is delivered to them. They are using alternative imaging products such as thallium. They are being forced to prioritize, sometimes postponing exams and sometimes even restricting the number of patients.

● (0910)

[*English*]

Since the beginning of the medical isotope supply shortage, Lantheus' Canadian operation has had one objective: to ensure that as many patients as possible receive their treatments or diagnostic tests. To achieve this goal, we have identified and implemented a number of actions.

We are working closely with Health Canada and the other companies that operate commercial radiopharmacies to ensure that technetium generators and unit doses are utilized equitably. We coordinate distribution of unit doses to all customers to make sure that all customers have some product for imaging.

We continue to collaborate with provincial health authorities to try to provide a similar level of available unit doses to health institutions that do not have radiopharmacy service.

To maximize unit dose availability, we have extended our radiopharmacy working hours to include evening and weekend production to maximize the quantity of technetium that is available.

We have substantially increased the availability of thallium, a product manufactured in a cyclotron, as an effective substitute to technetium-based cardiac agents such as Cardiolite. A vast majority of our customers have switched to thallium in periods of technetium shortage, assuring us that a baseline level of cardiac testing for patients has been maintained.

The significant efforts that Lantheus is making to develop a network of positron emitting radiopharmaceutical, or PER, manufacturing sites across Canada will not only have an important impact on the availability of existing Health Canada approved PET products for the Canadian health care community, but it will also prepare the market for the introduction of future innovative PER technologies and effective research PERs, such as sodium fluoride and other F18-based compounds that could be made available in a CTA environment.

The isotope supply crisis has also raised interest in other newer technologies and imaging modalities such as PET imaging. Lantheus already distributes GLUDEF, F18 fludeoxyglucose, a product used in the evaluation of patients with suspected cancers. We manufacture GLUDEF through a manufacturing partnership with the University of Sherbrooke. Lantheus is in the process of expanding the availability of GLUDEF to other parts of the country, and it is actively working on commissioning two other production sites, at the Montreal Neurological Institute and the Lantheus Mississauga radiopharmacy. Our strategy is to expand the PER pharmacy network to other parts of Canada to more broadly serve the needs of the Canadian medical community in the future.

● (0915)

[*Translation*]

Since our international operations are located in Montreal, Lantheus has a number of major clients in Canada. We are extremely determined to meet the needs of the Canadian market and we are doing everything possible to ensure that Canada receives the largest possible share of available technetium during this difficult time of reduced supply of medical isotopes. However, many of the solutions we have already discussed are short-term measures intended as stop gaps until isotope supply becomes accessible once again.

Having the NRU reactor come back online would greatly assist in reducing the impact of the world isotope shortage, particularly in North America. Since the HFR reactor in the Netherlands was closed at the same time as the NRU reactor, the medical isotope shortage is being felt all the more, which demonstrates the importance of having access to accessible and diversified sources of supply throughout the world as well as the importance of cooperation between industry, regulatory bodies and project promoters.

We believe that the short- and medium-term solution to ensuring stable medical isotope supply for Canadians is to repair the NRU reactor as quickly as possible and to provide financial support to efforts to ensure that the licence is renewed until 2016.

At Lantheus Medical Imaging, we are extremely determined to work with our clients and their patients, our suppliers and government agencies in order to ensure a more stable supply of medical isotopes in both the short and long term for the medical community and for patients, for whom we are all working.

Thank you for giving us the opportunity to speak with you today. We greatly appreciate this privilege and we would be pleased to answer any questions you may have.

[*English*]

The Chair: Thank you very much, Monsieur Villeneuve, for your presentation.

You'll both be available for questions, I understand.

We'll go now to a video conference with Eric Turcotte, medical specialist in nuclear medicine and clinical head of the Molecular Imaging Centre of Sherbrooke. He's appearing as an individual.

Go ahead please, Mr. Turcotte.

[*Translation*]

Dr. Eric Turcotte (Medical Specialist in Nuclear Medicine, Clinical Head of the Molecular Imaging Centre of Sherbrooke, As an Individual): Thank you very much, Mr. Chair, for the invitation.

I come here wearing many hats: a doctor specializing in nuclear medicine, a professor teaching residents in training in nuclear medicine and radiology and producer of isotopes. I am also a doctor who takes care of patients. Thank you for the invitation. Can you hear me?

[*English*]

The Chair: Go ahead, please. Everything is great.

[*Translation*]

Dr. Eric Turcotte: Good.

My presentation will be quite brief, so as to allow a lot of time for questions. I imagine that you have many.

For almost a year now, we have been dealing with the isotope shortage in Sherbrooke and throughout Quebec. Approximately 30% of the shortage is a result of the shutdown of the NRU reactor. There have been benefits for the health care system, but it has also caused problems.

With regard to the benefits, I am referring mainly to the optimum usage of medical isotopes. Isotopes were no longer wasted if a patient failed to show up, we called the next person on the waiting list. One dose could be cut in half, which allowed it to be used for two patients. Since this product has a short life and we had it evenings and even weekends, we were able during that same period to really maximize usage. That is the positive impact of the shortage.

However, the alternatives created in response to the shortage are problematic. We are talking a lot about thallium, which is used in myocardial perfusion. We are using it as a substitute for MIBI, but it is not the best substitute. In comparison to the radioactive tracer, this product generates a much higher dose of radiation in patients and it is not as effective in overweight individuals. For people who are very overweight, the images generated are of lower quality. Ultimately, this has consequences on the health care system.

Other technologies can also be used, such as magnetic resonance and CT scans. However, even if these technologies are available, they are relatively costly. The use of such technologies has already been maximized. If we transfer people needing nuclear medicine exams to magnetic resonance imaging, for example, we're only moving the problem around. The equipment cannot deal with the surplus.

On the other hand, many new alternatives have been tried. Today, there is a lot of interest in positron emission tomography. A number of specialists and I believe that it is really the technology of the future. The problem is that, approximately 31 of these devices are available in Canada and 15 of them are in Quebec. The geographic distribution of this technology is not sufficient. It can be very well used in Quebec. We use it a lot. I would say that, in Quebec, the crisis has likely hit us less, given the availability of these positron emission tomography machines. Thanks to them we can do bone scans, myocardial perfusion studies and many other examinations. In my opinion, it is really a technology we should look to and we must encourage its development.

Doctors believe that patients should never be deprived of an examination. The NRU alone is responsible for 30% of the shortage in global production, but no patient has really suffered from the shortage. Some exams have been postponed, but everyone has been able to have an exam and no one has really suffered.

However, the Dutch reactor is now being repaired and the isotope shortage has reached 60%. As a result, the shortage will be felt, and I truly fear that some patients will not be able to get an exam in time. We will rack our brains and try to find solutions, but I can tell you that, at present, there are few solutions. Furthermore, we don't really have the time to find new ones.

The floor is now yours.

● (0920)

[*English*]

The Chair: *Merci, monsieur Turcotte.*

Now we go to questions, starting with the official opposition, for up to ten minutes.

Go ahead, please, Mr. Regan.

[*Translation*]

Hon. Geoff Regan (Halifax West, Lib.): Thank you very much, Mr. Chair.

[*English*]

The Chair: It's been a while since we've had questioning in this committee.

[*Translation*]

Hon. Geoff Regan: On behalf of my colleagues, I want to thank our witnesses.

[*English*]

The Chair: Just before you start, Mr. Regan, I would like to thank both parties for their presentations. I think this information really is helpful for the study the committee is doing. With the questions, we'll get a lot of the answers we're looking for.

Go ahead, Mr. Regan.

Hon. Geoff Regan: My seven minutes starts now, right?

● (0925)

The Chair: It starts now.

Hon. Geoff Regan: Thank you.

We're hearing reports this week, as we've heard reinforced this morning, of dramatically dwindling supplies of medical isotopes. We're also hearing numerous reports coming out of testing for cancer and treatment for heart disease being cancelled or postponed. We can imagine what a dramatic impact this must be having on patients and their families.

As recently as last Friday, when I asked the Conservative government in question period, they continued to deny that there's a growing crisis in relation to medical isotopes.

You may be aware that Dr. Jean-Luc Urbain, who is president of the Canadian Association of Nuclear Medicine, said the supply of isotopes will slip to about 25% on average, and of course the patients will feel the crunch. He's in fact talking about having to cut service. We've heard a bit of that this morning as well.

The Society of Nuclear Medicine in the United States is describing the shortage as “one of the most significant disruptions ever”, and supplies are expected to be scarce in Canada for about two weeks, according to nuclear medicine specialists. Perhaps we can hear more on that.

Hamilton Health Sciences experts say they expect to see the isotope supply drop to 15% by Friday.

The Ottawa Heart Institute has cancelled seven patients who were booked for appointments today: “Hospitals are being affected to varying degrees depending on their arrangements with isotope suppliers.”

So I guess I'd like to hear more from Mr. Turcotte.

[*Translation*]

First, I would like Dr. Turcotte to tell us about his personal experience, in his position, and the challenges that he and his colleagues face in managing this crisis.

[*English*]

The Chair: Monsieur Turcotte.

[*Translation*]

Dr. Eric Turcotte: Thank you.

That is an excellent question. There are major challenges. At present, we are being asked to do the impossible with a bare minimum. Among the major challenges, there is the fact that the shortage varies from one day to the next. It is extremely difficult to schedule exams, even within a 24-hour window. Since I don't know how much radioactive products my department will receive the next day, it's difficult to tell a patient the night before to get ready for a given exam. It's really a logistics problem. Sometimes patients are asked to come to the hospital, but then there isn't any radioactive product to use for their exams. That is really the number one problem.

Second, there is the issue of priority. When you only have 15% or 20% of a component needed for exams, it's clear that the most urgent cases get priority. However, it is difficult to determine which cases are the most urgent. In some cases, it may be a matter of life or death. We have to rely on common sense. It is essential to always determine whether the patient's exam can be postponed a few days or whether it is really essential, for example if the patient is about to undergo surgery or chemotherapy in the next few hours. It's a logistics issue. In order to compensate for this, we need to be able to operate on evenings and weekends, to ensure that the department is open when the product is available.

Third it is a matter of looking at the choices that can be provided to patients. The myocardial perfusion can be done to check blood vessels. Coronary angiographies or angiograms allow us to see blood vessels. The main advantage of nuclear medicine is that these exams are not invasive. Injecting radioactive products is the most invasive part of our exams. However, the proposed alternatives are sometimes more invasive. It may be necessary to put a patient on a gurney and use special injection products. Ultimately, the alternative may carry a higher risk of mortality than the nuclear medicine exam. Furthermore, diagnostic sensitivity can be decreased when using alternatives.

We provide other choices while ensuring that they will enable good diagnostic results and that they will not be harmful, while trying to do the utmost for our nuclear medicine patients. This is a daily challenge.

Hon. Geoff Regan: How much longer do you think you can continue to operate in this way? What do you think of the fact that the AECL continues to announce new delays with regard to the NRU program in Chalk River? Today, for example, I saw the following occur for the first time: the AECL announced that it would announce progress achieved later in the day.

Why are they announcing that they're going to make an announcement? It makes me somewhat fearful that the news will be very bad.

Dr. Eric Turcotte: The question is also very relevant.

Since the situation began a year ago, hospitals have learned to live with the 30% shortage created by the shutdown of the NRU. Clearly, this has generated increased stress for staff and doctors, because operating hours vary widely. In the past year it was possible to practise very good medicine and to take good care of patients. The current problem relates to the Dutch reactor's breakdown, which has added an additional 30% shortage, which really hurts. The delicate balance that we had achieved at 70% of operating capacity has dropped to less than 30%. This is a major problem.

With regard to the NRU's repair, clearly, the fact that its repair is being done at the same time as that of the Petten reactor means that the situation remains problematic. At present, things are even worse, since maintenace work is being done on other nuclear reactors during the week. This has worsened the crisis for us. In reality, as long as there is a shortage at the two major reactors, the situation will remain extremely precarious with regard to our exams.

As for announcements about the progress in repairs to the NRU reactor, honestly, in medical circles, it has almost become a joke to get an AECL report talking about 30%, 35% or 40%. Medically speaking, this is irrelevant. We only want the reactor to become operational again. The repeated postponements that have been announced since January have meant that we no longer take AECL seriously.

We continue to hope that the reactor will resume operations by fall. It is likely more realistic to think that it will happen in the fall rather than in the spring.

● (0930)

[*English*]

The Chair: Thank you, Mr. Regan.

Madam Brunelle, for up to seven minutes. Go ahead, please.

[*Translation*]

Ms. Paule Brunelle (Trois-Rivières, BQ): Thank you, Mr. Chair.

I want to thank our witnesses for coming.

You know, this situation is of great concern. Every week, we hear about the sick and people who are worried.

Dr. Turcotte, you said that examinations were continuing but that you could cite cases where some exams were postponed, mainly for seniors, in your region. It remains of grave concern no matter who it is.

Mr. Villeneuve, you said that the Chalk River reactor shutdown had a significant impact on you. You told us how you had managed to adjust to the situation. I would like to have more details on the consequences.

I would like to ask you another question. You said that your thallium production had increased. Dr. Jean-Luc Urbain, President of the Canadian Nuclear Medicine Association, told us that this was a 20th century technology, meaning a technology that could be used for now but that was nonetheless out-of-date.

How do you see the future of thallium? Is it really simply an alternative or do you think that, in the long term, this will be a future solution, if the shortage continues and Chalk River remains closed for a long period of time?

Mr. Cyrille Villeneuve: From May until recent weeks, the impact has been approximately 50% of Canadian supply. Now, with the shutdown of the Dutch reactor, it is becoming increasingly difficult to predict exactly what the impact will be in coming weeks. So, the longer this shortage continues, the fewer alternatives we have. We do not have a plan B or a plan C. So we are at the mercy of various reactors.

I can tell you that we are looking everywhere to try to find everything available. To date, we have managed to find a significant share, between 40% and 50%. However, we are not producing molybdenum ourselves.

With regard to thallium, it's really a substitute product, recommended by Health Canada. So, at the request of doctors who want to use it, we reactivated our cyclotrons and we are meeting the demand... We feel that this is temporary, while we wait for technetium to become available once again.

I think that Dr. Turcotte gave a very good explanation of the advantages and disadvantages of thallium. I think that his medical expertise is far superior to mine. So, if you need other comments on this matter, I would prefer that he answer.

Ms. Paule Brunelle: Good day, Dr. Turcotte. You said that thallium is not ideal because it is less effective. Some doctors have told us that some products cannot be given to children, for example, or may have certain effects, because too much energy is emitted or something like that. Is thallium one of those products?

Dr. Eric Turcotte: In my opinion, thallium is not an ideal isotope these days for nuclear medicine. It is however an acceptable alternative. It exposes patients to too much radiation. Exams done using that isotope emit more radiation than any other in nuclear medicine. To give you an example, a regular bone scan exam results in dosimetry of 8 millisieverts, meaning the dose absorbed by the patient. Eight millisieverts is acceptable. A cardiac exam using thallium will result in an approximately 30 millisieverts dosimetry, which is quite high.

Furthermore, that exam produces a lot of radiation and the image quality is not what we can expect from a nuclear medicine test today. The resolution is not as good and when patients are even slightly overweight, it becomes extremely difficult to see the heart. In such cases, diagnostic errors may occur, when we use thallium. That said, for patients who are thin and underweight, it remains an acceptable radioactive tracer that provides good results in those conditions. However, if a patient is even slightly overweight, I would rather use positron emission tomography, using myocardial perfusion agents. In such cases, these agents have half-lives of approximately 10 minutes. So this must be done locally, on site, for patients. This must be used on site. This makes the technology extremely inaccessible.

Ms. Paule Brunelle: I would like you to tell me a bit more about positrons. You are telling us that this may be a good solution for Quebec because it has 15 of the 30 devices. What kind of technology is this? Where can we obtain a supply of positrons? Tell me more please.

Dr. Eric Turcotte: The beauty of positron technology is that, first of all, it does not depend on nuclear reactors whatsoever. To produce isotopes, we need a cyclotron. Hospitals and universities have one. There is one at the Molecular Imaging Centre in Sherbrooke, one at the Montreal Neurological Institute, one belonging to a private company called Pharmalogic in Montreal. There are also several in Ontario. This equipment uses electricity. So we establish a target, turn on the electricity to the cyclotron and isotopes are produced.

The disadvantage of isotopes produced using the cyclotron is that these isotopes have short half-lives, half lives of 10 minutes, 20 minutes, 110 minutes, 3 hours. This is far from technetium's 6 hours or even further from molybdenum's 66 hours. As a result, these isotopes need to be produced each day they are used.

What else do we need, in addition to cyclotrons, for positron imagery? We need special equipment. We cannot use the SPECT devices, the gamma-cameras that use technetium, in order to use the positron. This means that the some 600 SPECT devices available in Canada cannot be used with positrons. We are really limited to the 30 devices available. These are relatively costly devices. We are talking about technology worth approximately $2.2 million. SPECT technology, a 2010 technology, which uses technetium, costs $1.1 million. The PET device is only twice as expensive.

The results are far better in terms of diagnoses. Exams are much shorter. A bone scan exam using nuclear medicine may last four hours. The patient must then spend four hours at the hospital in order to undergo the exam. The same exam done using sodium fluoride positron technology will last 45 minutes. So there are a number of advantages, including better resolution, better diagnoses, much less time spent in the hospital, and many more patients can be diagnosed each day. That is why this technology, in 10 or 15 years, will become the preferred technology. However, we are not there yet. We do not have enough cyclotrons.

Furthermore, I would like to stress that these famous cyclotrons can produce isotopes using positrons. The cyclotrons are really helping us survive this shortage to some extent. They are producing thallium and gallium-67. The nuclear reactor is producing iodine-131 and technetium-99, by using molybdenum and nuclear medicine. The remaining isotopes are produced using cyclotrons. So it is a good hybrid technology that can produce old isotopes one day and new ones the next.

● (0935)

[*English*]

The Chair: *Merci, Madame Brunelle*.

We will go now to the New Democratic Party.

Mr. Hyer, you have up to seven minutes. Go ahead, please.

Mr. Bruce Hyer (Thunder Bay—Superior North, NDP): Thank you very much.

My questions are for Dr. Turcotte.

Dr. Turcotte, I have a short time. Please give brief answers if possible, because I have several questions. Let me do my first group of three questions, and then answer those, and if we have time, we'll do a little more.

I'm trying to understand why—this is in the broader context of the report of the expert panel, not all of which you touched on today—given the high cost, of at least $0.5 billion or maybe $1 billion, and the long timeline of a multi-purpose research reactor, the panel's report appeared to emphasize that option. Did the cost you considered include the permanent storage of nuclear waste?

Given the projected excess capacity in the longer term, as opposed to the short-term shortages that we have now, why is there such a long-term and expensive option, given the long lead time before production? Did the environmental and security risks posed by nuclear waste factor into the panel's decision? When considering the cost of a new reactor, did the panel look at the significant cost overruns that have traditionally occurred to a huge degree in reactor refurbishments or new reactors?

We've previously had other expert witnesses before this panel who have been much more sanguine about the thoughts of linear accelerators or cyclotrons rather than about using the traditional nuclear technology.

Could you answer those questions, please?

● (0940)

[*Translation*]

Dr. Eric Turcotte: With respect to the nuclear reactor, I remain convinced that the number one solution for us to have isotopes over the medium and long term remains the construction of a new nuclear reactor. But we mean a multi-purpose nuclear reactor, one that can also be used to do research. The problem with nuclear reactors lies with the operating costs and the cost of the infrastructure itself. To produce only isotopes in a nuclear reactor would offset approximately 10% of the investment costs, which is an unacceptable solution given the current economic context. But from a scientific standpoint the known way of producing technetium is with a nuclear reactor. It has been done in this way for 50 years, and it is certain that a new nuclear reactor built in Canada would be able to produce technetium.

As for other technology, like cyclotrons, linear accelerators, I think it is something we should investigate, to determine whether it is possible to produce isotopes with that technology, but it remains within the realm of research. It is unclear whether it can work and we should avoid putting all of our eggs in the same basket when it comes to this technology. We need to give these technologies the time to show they are effective, perhaps a year or two at most, but afterwards, if they have not proven their viability and usefulness, the nuclear reactor would be the best choice by far.

[*English*]

The Chair: Mr. Hyer, do you have more questions?

Mr. Bruce Hyer: I do.

This is a combined question. Wait until I am finished, and then I'd love to hear a punchy answer.

Has the current minister or the previous minister contacted you or your panel with a response to the expert panel report, and what was that response? Is the delay in issuing a public response to that report acceptable, in your view? Are there any good reasons, in your view, for such a delay?

[*Translation*]

Dr. Eric Turcotte: The expert panel has yet to receive a response from the Department of Natural Resources. We certainly do hope to get one. Honestly, four men have spent an enormous amount of time studying the situation and preparing a very serious and in-depth report, so we are expecting to receive a response. I should point out that we are disappointed in the delay, that is for sure, and we are anxious to know the answer, because it will have a direct impact on the way in which physicians work and on the health of patients in Canada.

[*English*]

Mr. Bruce Hyer: What are the impacts of this lack of leadership on patients?

[*Translation*]

Dr. Eric Turcotte: If at least there had been an answer or some energy had been expended, we would probably have solutions or possible avenues to get our spirits up in this time of crisis.

And that is not the case at all. At the moment, we are experiencing a crisis because we have no other choice but to experience it. We have no idea where to turn. So, in other words, we have no idea whether the situation will remain chronic or if it is simply acute. Honestly, the medical community is anxious to know the fate of isotopes in Canada.

Is this a problem we must be resigned to accepting for the rest of our days, or is there a light at the end of the tunnel?

● (0945)

[*English*]

Mr. Bruce Hyer: Do I have time for one more short question?

The Chair: You do.

Mr. Bruce Hyer: This question is to Monsieur Villeneuve.

If your company doesn't resolve your differences and sign a new contract, how's that going to affect the supply to Canadian hospitals? What source of isotopes could be or would be used? How will this impact the costs of isotopes? What have been the pricing impacts of the repeated delays of the Chalk River NRU now?

Can you provide the committee with any figures related to the questions that I've just asked? And have you ever seen a supply crisis like the one you are now experiencing?

The Chair: You have a whole minute to answer all those questions. Go ahead, please.

Mr. Bruce Hyer: You could follow up with the figures perhaps later, if that's possible.

Mr. William Dawes (Vice-President, Manufacturing and Supply Chain, Lantheus Medical Imaging): Thank you.

Maybe to sum it all up, we don't really disclose the information specific to our contracts. But as it applies to the Canadian customer and patients, ultimately we're working to diversify our supply chain and establish the best approach to supply all of North America in an equitable fashion. We've been doing that over the past year or so and we'll continue to do that in the future. We expect that it will be more difficult perhaps in an environment without NRU or perhaps without HFR. But we'll continue to endeavour to do that in whatever environment we ultimately land in as a community and as a business.

The Chair: Thank you.

To the Conservative side now, Mike Allen for up to seven minutes. Go ahead.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you, Chair.

My first few questions are for Lantheus. I just want to continue on with the supply chain. I guess, Mr. Dawes, you'd be the one to talk about this.

Give us an overview of that supply chain from the point where you get the product from an NRU. Where are you getting your product from in that context? Let's assume some of it would be coming from the NRU and other reactors.

Can you take us through the timeframe from the time you get that until you actually produce a product? How do you guarantee, or is there any guarantee of supply for Canada? We know that a predominant amount of the world's supply can come from the NRU, but it doesn't all come back to Canada. I'd like to understand if there is a guarantee on the guaranteed supply.

Then the third question would be, what other technologies of these others you've talked about, like GLUDEF, for example...? How do you see that impacting that supply chain going forward?

Mr. William Dawes: Let me start with the where and with a kind of timeframe for production. I think many who have studied this topic are familiar with the global supply chain. There are global suppliers of molybdenum around the world. These are the reactor producers or reactor-based suppliers. They include Nordion, through their relationship with AECL in Canada; IRE, through their relationship with three reactors in Europe; and Covidien, through their relationship with a number of reactors in Europe. Also, there are folks down in South Africa operating the SAFARI reactor, and the name of that firm is NTP.

There's a new reactor that has come online in Poland and is offering some promise of additional supply to the global medical isotope community. Also, there's a new reactor that has been built and is in the process of having its production ramped up so that it can also be a contributor to the global supply of molybdenum.

That's what the reactor supply chain looks like today.

As we look at the medium term, we see a number of solutions that we hope will come online in the future. There are solutions in various geographic locations, with some proposed in the United States that are in the medium term to the long term. Others are proposed in other geographies of the world. Either these exist today and will go online in the future to potentially produce molybdenum, or they are others that will be built in new geographies.

Looking at the timeframe for molybdenum production, or technetium production, as in our case, it is really a real-time supply chain. At Lantheus, what we see during normal times is a five-times weekly basis, and during less than normal times, it's something less than that. What we see is ourselves sourcing material from these global suppliers. In the event the materials come in from Canada, it takes about an hour and a half for us to transport material to our site from the finishing site at Nordion. In the case of NTP and South Africa, it takes in excess of 24 hours to transport that material from the reactor site following the finishing process to our site just outside of Boston.

Once that material is delivered to our site, at either eight o'clock in the morning or eight o'clock in the evening, depending on the run time or the start time of our run, it then takes us about eight to twelve hours, depending on the size of the run and different parts of the manufacturing process, to produce, perform quality testing, and then release those generators. Those then go into our distributional logistics system and are then distributed to locations throughout North America—to include Canada—and then also to some small number of international locations.

That supply chain, and the logistics portion of the supply chain, brings us full circle in most cases to where, ideally, we can see a patient dose being delivered to a patient only 24 hours after our first manufacturing step conducted at the home office at the Billerica site. Doses that started being manufactured as a generator at eight o'clock in the morning on a Monday, as an example, could go into a patient as early as eight o'clock in the morning on Tuesday.

It is very, very much a real-time supply chain. It is one where we carry no inventory because of the half-life and decay of the product and one that needs to be very reliable in order to ensure that we're getting the patients what they need and getting the doctors, ultimately, what they need to do their job for the medical imaging community.

When we look at how we guarantee the supply to Canada, I think it's important for everyone to understand that we have a very, very significant Canadian business as part of our portfolio at Lantheus. That part of the business in Canada is a very, very important part of our business. We work extremely hard across our customer base, both in the United States and in Canada, and for some of those global locations that I described, to ensure that we are equitably distributing the material that we are able to source from these global reactor producers.

We have that approach of equitability regardless of where that supply is coming from. We're really working to ensure that the maximum number of our customers and, ultimately, their patients can be supplied under any of the supply chain circumstances that may exist at any given time.

Could you restate the last question for me?

● (0950)

Mr. Mike Allen: It was on some of these other technologies you were talking about, like GLUDEF, for example. You're starting to explore some of these. How do you see that changing your supply chain going forward?

Mr. William Dawes: I think the F18-labelled products will change things very significantly. They will facilitate a change in the overall manufacturing logistics associated with these diagnostic imaging products. We'll see ourselves moving from an environment where we're sourcing as much material today from the reactors, to an environment where perhaps we're sourcing less material from reactors. As we look at our own pipeline, we're very focused on the development of F18-labelled compounds. The problem with them is the manufacturing infrastructure isn't in place today, nor is there the camera infrastructure in place to really be able to support significant deployment of that imaging modality, especially for cardiac in the future.

So there will continue to be a significant reliance on molybdenum-99 in these reactor producers while this F18 network is being deployed in the future. At the same time, as we look at our own products, we don't see those necessarily being a replacement for the current mo-99-based products, or the tc-99m-based products. We see them being a solution that maybe sits in the middle between that SPECT scan and the more invasive cardiac catheterization that Dr. Turcotte spoke about, to decrease and deal with the issues such as co-morbidities associated with those more invasive procedures.

So we always see an environment where mo-99 is required and is an important isotope, but we also see an environment where PET will play an increasing role as the products are developed and the infrastructure is developed to support them.

Mr. Mike Allen: Chair, how much time do I have left?

The Chair: You have no time at all, Mr. Allen. Aren't you sorry you asked?

We will go now to a very short second round of about two minutes each, so keep the answers short as well.

Mr. Regan, go ahead, please.

● (0955)

Hon. Geoff Regan: Thank you, Mr. Chair.

Mr. Dawes, in response to Mr. Allen's question you indicated that you spread out the isotopes you receive, and basically that could be around the world. So it sounds to me as if you're saying there's no guarantee, when the NRU gets back up and running at Chalk River, any of that will come to Canada. Certainly there's no guarantee that all of it will come to Canada. What you get you will distribute equally.

Do you have a contract with MDS or MDS Nordion right now for supply when the NRU comes back up? Am I right in saying there's no guarantee? Surely as a private corporation your responsibility is to your shareholders. I presume you will be selling those isotopes where you can get the best bang for your buck, so to speak, or best buck for your bang.

Mr. William Dawes: Let me start by answering the Nordion question. As I said to Mr. Hyer, we don't comment publicly about the status of our contracts and relationships, so unfortunately I can't do that in this forum. But I'd like to turn things over to Cyrille to talk about how we would allocate those materials to the Canadian customers, and how we really think about equity as it applies to the Canadian market when we have supply of molybdenum-99.

Mr. Cyrille Villeneuve: Mostly what we have done and will continue to do is really look at the global market and specifically at North America to make sure that every market gets its fair share. I would say that it's a bit strong to say there's no guarantee that Canada will get anything, because if we were only looking at the money, we could have decided now to not supply Canada. Canada has a very fair proportion of what we were able to get from the different suppliers.

So I can tell you that we will continue to supply Canada. Canada will get its fair share of material. It will not be disadvantaged compared to other markets, for sure. But we cannot give you a guarantee that everything from NRU will come to Canada.

The Chair: Madam Brunelle, do you have a question?

Go ahead, please.

[*Translation*]

Ms. Paule Brunelle: Mr. Turcotte, the government's recent budget provides for $35 million in investments by Natural Resources Canada for R&D work. Much of this work is done within the context of the TRIUMF project at UBC. Perhaps this is just a rumour, but I heard that it would take quite a long time before isotopes could be made available. These would be research projects. What is your opinion on the TRIUMF project?

Dr. Eric Turcotte: Are you referring to the cyclotron- or photofission-based technetium project?

Ms. Paule Brunelle: The particle accelerator. I am not sure if it is the cyclotron.

Dr. Eric Turcotte: Two projects are currently underway under TRIUMF. One is a joint project with the Canadian research institutes. It is to manufacture technetium produced by cyclotron. This university project involves TRIUMF, the BC Cancer Agency, Sherbrooke University, an institution in London and the Cross Cancer Institute, in Alberta. Together, these people are trying to determine whether it is possible to produce technetium using a cyclotron. That was the second recommendation from the panel.

TRIUMF also has photofission technology. According to the experts, this technology should be avoided as much as possible, because it is very costly and, from an environmental standpoint it can generate more waste than a nuclear reactor. I am not sure what technology you are referring to, but I believe that cyclotron technology is probably what will cost you the least amount of money while giving you the best performance. The other technology may turn out to be more costly and more disastrous from an environmental standpoint.

Ms. Paule Brunelle: Are they at the research stage or have they gotten further than that? Would it, for instance, be possible to produce technetium within a reasonable timeframe?

Dr. Eric Turcotte: Recommendations two, three and four of the expert panel have to do with research projects. It is probable that we may be able to produce technetium with this technology. However, marketing it would be another matter. The problem is that marketing would require a type of infrastructure no one in the world currently has. To try to produce technetium with cyclotrons, we do not have a robotic arm allowing us to work while protecting us from radioactivity. Staff is being irradiated. We do not have the commercial facilities needed to test the technology. It would require a $4-million to $5-million investment.

● (1000)

[*English*]

The Chair: Merci, Madam Brunelle.

Finally is Mr. Anderson for around two minutes.

Mr. David Anderson (Cypress Hills—Grasslands, CPC): Just to build on that a bit, it has been interesting this morning to hear about the myriad of different types of technology that are being developed.

I'm just wondering if both sets of witnesses can give us an idea of what the field of nuclear medicine will look like in 10 years. We're hearing about all kinds of things: PET scans, F18, cyclotrons being used, the large reactors, and reactors opening up around the world. What is your industry and nuclear medicine going to look like 10 years from now?

Mr. Cyrille Villeneuve: From our perspective, the technetium market will be flat at best, or will decrease to a certain percentage over 10 years, and the PET technology will increase significantly as soon as the equipment and the infrastructure are built. The PET technology offers a very nice alternative with better sensitivity and specificity, so it will give better results than what we have today.

It's like comparing what we had at the beginning when we were talking about thallium versus Cardiolite. Thallium was the first generation; Cardiolite, technetium, is the second generation. We believe that PET is the third generation. But considering the fact that there is a cost related to that, we still believe that technetium will play a role, but it will not increase in North America. It'll probably decrease slightly over the next 10 years.

Mr. David Anderson: Dr. Turcotte, I'd be interested in your response as well.

[*Translation*]

Dr. Eric Turcotte: I believe positron emission technology is by far the best solution for the Canadian public when it comes to diagnosing cancer and other problems. As Mr. Villeneuve just mentioned, we have worked with technetium-based technologies for the last 40 years. So there are 40 years of history on the production of radiopharmaceuticals, in this area. Positron emission tomography is 10 years old. It cannot replace everything that can be done well with technetium.

However, it is the road to take, the technology of the future. It really is. In time, we will transition from the old way of doing examinations and the new one. It will be beneficial to all. The fact remains that we are currently in this transition phase. I do believe we have to take this tack to allow medicine to evolve and to provide better service.

[*English*]

The Chair: Thank you, Mr. Anderson.

Thanks to everyone for your questions in the first hour of our meeting today, and thank you very much to the witnesses, Monsieur Villeneuve, Mr. Dawes, and Monsieur Turcotte, for your answers. They were very helpful to the committee.

I will suspend the meeting while we change witnesses.

● (1000)

(Pause)

● (1005)

The Chair: We are back again with our second hour. We are continuing our study of the status of the NRU reactor and the supply of medical isotopes.

Our second panel includes Daniel Banks as an individual, and Gordon Tapp from the committee for creation of a national laboratory at Chalk River. From TRIUMF we have Tim Meyer, head of strategic planning and communications.

Welcome gentlemen. I really appreciate you all being here today. We will hear presentations in the order you are in on the agenda.

Mr. Banks, go ahead for up to 10 minutes.

Mr. Daniel Banks (As an Individual): As the chair said, my name is Daniel Banks, and I'm here to testify as an individual, and more specifically, as an individual who is part of a grassroots group of volunteers known as CREATE. With me today is Gord Tapp, who's also a member of CREATE.

First, let me tell you what CREATE is. CREATE stands for Chalk River Employees Ad-hoc TaskforcE for a national laboratory. Some call it an awkward acronym, but I prefer to call it a creative one.

CREATE is, as I said, a grassroots, non-partisan group of volunteers. It includes current and former employees at Chalk River. I emphasize that each one speaks for himself and not for his employer. In May, Natural Resources Canada announced that AECL would be restructured. A few months later, CREATE was established as a grassroots effort to propose a vision for the future of Chalk River as a national laboratory that would include a new multi-purpose research reactor.

In the fall, CREATE developed and proposed its concept for the future mission of Chalk River, and we solicited support for our concept through consultations with other staff at Chalk River and vetted it with experts. We revised our vision as a result of those consultations and the feedback we received from the community and from staff. The results of this work are presented in our report, which is available on our website, “www.futurecrl.ca”. We've given some copies of the report to the committee clerk.

I would like to briefly present that vision.

The future Chalk River National Laboratory, or CRNL as I will call it, would be a vehicle for mobilizing science and technology to Canada's advantage by greatly broadening its scope. As a national laboratory, it would serve Canada, rather than serving one corporation as a company laboratory. We envision that CRNL would be Canada's premier laboratory for nuclear and related sciences.

Incidentally, I want to interrupt my presentation to comment that TRIUMF, which is also represented here today, is Canada's national laboratory for nuclear physics and particle physics, and although that may sound a lot like what we're presenting, it's quite different in practice. Chalk River and TRIUMF are complementary facilities rather than redundant ones. I just wanted to be clear on that.

Back to Chalk River National Laboratory—it would be a resource for researchers from across a broad spectrum, from fundamental sciences to industrial applications, including but not limited to research in development that supports the nuclear energy sector in Canada. Compared to the Chalk River of today, CRNL would be much more outward-looking by partnering and impacting at all levels of Canadian society. That outward focus includes several new functions—new to Chalk River—which includes leading diverse research programs beyond nuclear energy; partnering broadly with universities, industries, and government; as well as commercializing knowledge through high-tech spinoff companies incubated at Chalk River, or knowledge that is commercialized through transfer to industry partners and encouraging entrepreneurial investment in that sense.

In addition, by partnering with post-secondary education, CRNL will serve as a training ground for Canada's future generation of scientists and engineers by providing them with a creative research environment as well as world-class research equipment.

Such a national laboratory will also be a powerful tool for encouraging young people to seek science-based careers and for fostering a science and technology culture.

In summary, CRNL will be a major player in a greater mosaic of institutions across Canada that will help to build a sustainable national competitive advantage based on science and technology.

● (1010)

We see that the opportunity has arrived to begin a transition of Chalk River into this Chalk River national laboratory by establishing a future direction, such as we have proposed, with a suitable governance and business model to go along with that, in consultation with potential partners and clients.

In parallel to all of this, we also believe it's important to begin detailed planning for a new multi-purpose research reactor for research and isotope production that can take over and expand the functions of the aging NRU reactor over the long term. We believe the question of that new multi-purpose reactor is very closely related to the question of the future of Chalk River as a whole. It's difficult to consider those concepts in isolation.

Now that I have set out CREATE's vision, I want to emphasize a few points.

First, as a national laboratory, Chalk River would require baseline federal funding, but it would also attract revenue from various streams. Sources of revenue would include research partnerships with industries, including the commercial CANDU business that would result from the restructuring of AECL. It would also include full cost-recovery fees for access to its resources for proprietary research, waste management, or isotope production. We think this is indeed an important change. The practice of recovering full costs for proprietary access to the facilities would be a major step towards ensuring sustainability in a global supply network based on sound economics for isotope production.

Secondly, the future of Chalk River is a much larger question than the question of isotope supply. Of course, medical isotope supply is important to Canada, but it's only one of the issues. This was in effect recognized by the NRCan expert panel on medical isotopes, when it stated that “a multi-purpose research reactor represents the best primary option to create a sustainable source of Mo-99, recognizing that the reactor's other missions would also play a role in justifying the costs”.

Let me talk about the business model a bit more, because CREATE believes the other missions justify the costs.

Nuclear energy research and development will remain a key area. Canada's investment in the NRU reactor has been paid back significantly by spawning the Canadian nuclear energy industry, which is currently an enterprise of $6 billion per year, with significant room for growth. But even if no nuclear power reactors are built in Canada, R and D is needed to support the existing fleet of CANDU power reactors around the world.

For example, a research reactor would be used to obtain more precise knowledge of the conditions of materials inside nuclear power reactors that cannot be obtained by other means. It is likely the increased precision of that knowledge could allow Canada to safely extend the life of its reactors. Life extension of the fleet for even a few years would likely save Canada billions of dollars in electricity generation costs.

However, nuclear power is likely to be an even greater part of Canada's energy portfolio in the future than it is today, in part because we need clean sources of energy to replace depleting supplies of conventional fuels. In that case, nuclear R and D will be essential to take advantage of the energy available in our uranium deposits.

There are then all the other benefits of research in other areas, from biotechnology and nanotechnology to improving the reliability of aircraft components and bridges. There are also benefits in attracting and training highly skilled people. These benefits are more than the substantial economic impacts. They're also in health, energy, security, education, the environment, and the general well-being of Canada and the world.

● (1015)

The Chair: Thank you, Mr. Banks.

We go now to Tim Meyer, head of strategic planning and communications, TRIUMF.

Go ahead, please, Mr. Meyer.

Mr. Tim Meyer (Head, Strategic Planning and Communications, TRIUMF): Thank you for the opportunity to be here, Mr. Chairman and distinguished members of the committee.

I want to compliment you on the organization of these panels. The first panel focused on emergency response and first aid. As witnesses, we're looking a little bit further down the road.

I'd also like to thank the citizens of Canada for their vote of confidence in TRIUMF with the announcement of core operating funds in Minister Flaherty's budget 2010. It really sets TRIUMF up to make a big difference for the future.

We're discussing today the present state and future vision for medical isotopes in Canada. I'm here to say that repairing the NRU reactor is only half the story. We need, and Canada needs, more than a return to business as usual.

Some may remember the oil crises of the 1960s and 1970s. These incidents gave the western world a glimpse of the fragility and the vulnerability of the oil-based energy supplies of the day. Although there's not a direct parallel, the current crisis in supply of reactor-based medical isotopes should open our eyes. Yes, a return to operation for the NRU is urgently needed, but is there a broader lesson?

Fortunately, Canada is rich with alternatives for making and using medical isotopes and there are promising moves forward to exploit this. In fact, Canada has a global advantage that we can use to save lives and maintain a dominant role in a billion-dollar global market. You've heard about some of these alternatives from my distinguished colleagues.

Let me say something about TRIUMF's role in this. As a national laboratory owned and operated by 15 of Canada's great universities, we are committed to developing short- and medium-term solutions, as well as a long-term vision for nuclear medicine in Canada. You've heard some of that from the other folks this morning.

We have a 30-year partnership working with MDS Nordion in Vancouver, which generates 15% of the medical isotopes exported by Canada each year. This amounts to about 2.5 million patient doses.

TRIUMF is a centre of excellence for the physics, chemistry, and biology of medical isotopes. We are fundamentally a basic research and development laboratory. Deployment of technologies we do with commercial partners. TRIUMF is not in the business of producing isotopes for commercial sale; we're in the business of generating the ideas and the technologies that true business people can use.

Our short-term solution examines the viability of using existing medical isotope cyclotrons around Canada for direct production of technetium-99m. That's the isotope actually used in the radiopharmaceuticals.

Dr. Turcotte referred you to this brief earlier. He is part of a collaboration that was funded in October of last year for $1.3 million, with support from NSERC and CIHR, to examine this technology. TRIUMF and the B.C. Cancer Agency are leading this effort. The collaborating institutions include Sherbrooke with Dr. Turcotte, Cross Cancer Institute in Edmonton, as well as Lawson Health Research Institute in London, Ontario, and there is a small company involved as well.

This technology would use proton beams from existing commercial cyclotrons to irradiate a new target material, known as molybdenum-100, to produce the technetium. The advantage of this technology is that we'll be conducting human clinical trials within 18 months and it could be deployed without significant changes to the equipment already in place around Canada.

The disadvantages, some of which you've already heard, are that the medical isotope cyclotrons in Canada are limited, and by directly producing technetium, which has a six-hour half-life, you're limited to how far you can transport this medical isotope. However, as the regular adage goes, most of Canada is concentrated within a few hundred kilometres of the major population centres.

Another advantage is that this technology, if proven in the laboratory, is easily licensed in the private sector. The participating institutions are using cyclotrons manufactured in Canada, as well as models manufactured by General Electric. So this technology could not only work in Canada but also be licensed around the world.

TRIUMF is also investigating a more sophisticated medium-term solution, known as photofission, about which you've heard several times, and Dr. Turcotte referred to it earlier. This builds on Canadian breakthroughs in accelerator technology and proposes to integrate almost seamlessly with the current supply chain for molybdenum-99 generators.

We used to use reactors as the most intense source of particles for experiments. The world is moving to using accelerators for some of these applications because they can be easier and cheaper to license and operate.

● (1020)

With support from CFI—the Canada Foundation for Innovation—and other agencies, TRIUMF is constructing a new multi-purpose research accelerator. This device, known as the e-linac, or superconducting electron linear accelerator, will be used to validate the proposal of creating molybdenum-99 with a linear accelerator using natural uranium.

So there are two distinguishing features of this technology. It does not use weapons-grade uranium. It does not use diluted weapons-grade uranium. It's actually using U238, the isotope most naturally abundant and occurring in the ground, for instance in Saskatchewan. The second element of this technology is that the current competitive advantage that Canada enjoys in producing moly-99 is based on the partnership between AECL and MDS Nordion in separating out the moly-99 from the uranium and the rest of the junk. Thus, linear accelerator photofission technology would use that same mechanical and chemical separation.

Now, TRIUMF is in the business of fundamental research. This is a technology demonstration, which will be the first experiment we run on this new accelerator. If this demonstration lives up to its promise, the technology could be commercialized and licensed by about 2015. We're working with MDS Nordion to benchmark the business case.

It's key to point out that there's been some confusion about this technology and its generation of radioactive waste. It does use electricity, not a nuclear power reactor. In fact, a more powerful accelerator being built in Switzerland using similar technology is going to be powered entirely by windmills. It's possible. B.C., of course, is plentiful in hydro power. We're also working with other solutions that span the space of short and medium term.

Now, our long-term vision asks the question: the medical isotope crisis is really a supply and demand issue, how long will the global demand for moly-99 last? And you've heard some of the expert opinions on that. Our assertion is that the market dominance of molybdenum-99 is going to last for about a decade and probably not much longer. The future is being driven by the so-called PET isotopes and technologies, about which you've heard quite a lot from both Lantheus Medical Imaging and Dr. Turcotte.

PET isotopes offer lower radiation doses to the patient, improved sensitivity resolution, and, perhaps not as well known, much more sophisticated probing of biological and pathological pathways within the body. As we've heard, the challenge is deploying the production infrastructure and the scanning infrastructure. There are 31 PET scanners in Canada. In terms of the scanners for using technetium, there are about 2,000. However, for the first time in the last 40 years, the new sales of PET scanners have surpassed the new sales of the technetium scanners. So we are on the cusp of a market shift.

Canadians are in a tough spot presently, with the shutdown of the NRU and the HFR reactor. Our health care providers and nuclear medicine specialists have been incredibly resourceful to help us get through this time period.

There are a number of exciting paths forward. New developments are quite promising, such as the $48 million in federal funds announced in budget 2010, which will be dedicated to research and development for diversifying the supply of medical isotopes. The future is bright, and there is much work to do.

Thank you, again, for your time.

● (1025)

The Chair: Thank you, Mr. Meyer.

We will now go directly to questions, starting with the official opposition and Mr. Bains, for up to seven minutes.

Go ahead, please.

Hon. Navdeep Bains (Mississauga—Brampton South, Lib.): Thank you very much, Mr. Chair.

Again, thank you very much to the witnesses for creating the time to come here before us and for making your presentations.

My question is for CREATE. I just want clarification on your organization and on your involvement in creating this group. When you created this group, did you receive any assistance from politicians or political parties? Could you elaborate a bit on the process of how this group was created, please?

Mr. Daniel Banks: Actually, Gord was more involved at the inception, so I'd like him to comment on that.

Mr. Gordon Tapp (As an Individual): Thank you.

My name's Gordon Tapp. I'm sort of the unofficial spokesperson for the CREATE team. I was present when Ms. Raitt made her announcement about the restructure of AECL in Mississauga in May of last year and a lot of uncertainty, of course, popped up among the employees.

I'm also the president of the Chalk River Technicians and Technologists Independent Union up at Chalk River. At that time we also had some people down at Sheridan Park. So in order to allay a lot of concerns about the future of the two paths that are going to be taken by the AECL pieces—that CANDU part and Sheridan Park and the research part that was typically in Chalk River— I approached our local MP in Renfrew County, Mrs. Cheryl Gallant. I asked if she could address the employees up at Chalk River about NRCan's future plans.

A lot of us have seen changes at AECL over the past 20 years and we wanted to address those changes at the same time. A lot of us had a vision of what the future could be and it was suggested to us by Mrs. Gallant that if our voices are to be heard, we should do something on our own. At that time, several interested persons from AECL, or from the Chalk River site, got together, including retired employees, and we formed this committee.

So to directly answer your question of whether we got any help, the answer is no. I did supply some—

● (1030)

Hon. Navdeep Bains: Thank you very much. I appreciate the clarification. I just wanted to clear the record on that.

I had a follow-up question with respect to a question that my colleague Mr. Regan raised in committee before the minister a few days ago. He asked the minister if there was any money set aside in the 2010 budget for the groundwork for a new research reactor at Chalk River. The minister clearly said no. There was no hesitation on the minister's part.

What's your reaction to that news and the fact that the government is very clear that there is no new money and they had no intention of investing any new moneys as well?

The Chair: Go ahead, Mr. Banks.

Mr. Daniel Banks: Well, it's certain that beginning the planning process toward a new multi-purpose reactor would require a significant amount of funds. I don't know that we've actually seen the details of all of that money and how it's going to be used and whether any of that could be directed toward the planning process. It's not that we're looking for $1 billion in the budget now. If the reactor costs that much, we'll only know after some initial planning is done just to design the facility and see what it would cost in the end; that will depend on the design primers that you put in.

So I'm not disappointed that we haven't seen a $1-billion allocation at this point, because in the interest of proper planning and decision-making, that wouldn't be the next step.

Hon. Navdeep Bains: You raise a good point about planning. As you're fully aware—we've heard from the government in its budget—next year they're going to slash and cut many departmental budgets. They're going to continue to limit the federal's capacity and continue to make significant cuts.

Don't you think it's not realistic, if you didn't receive anything this year, during a stimulus year...? What's the likelihood of additional funding on a going forward basis when there's going to be significant cuts?

It's very difficult to plan when you have no upfront money. Then the likelihood of future funding is very clearly going to be minimal, if next to nothing, because of the fact the government's going to actually cut money.

How does that play out for you? How does that help you in terms of your planning projections?

Mr. Daniel Banks: Being here as an individual, I can't really comment on how that affects the individual departments involved. Of course we know that some funds will have to come from somewhere. We certainly would like to see that sooner rather than later, just because of the risks involved in significant delays. NRU can be repaired and that's sort of a short-term fix. Planning for the long term has to take place at some point. We do recognize that some risks are involved, in that a new facility would take perhaps 10 years to properly plan, design, and build. That's about the timeframe you're looking at when, perhaps, NRU would no longer be available.

We do see there's a risk involved that, if there's a significant gap between the two facilities, could lead to the loss of a lot of key expertise in Canada. I think that's an important issue that should not be overlooked. If for some reason we no longer had the NRU reactor and there wasn't a certainty of a new facility, I think we would lose critical mass of expertise at Chalk River, probably quite quickly just because most talented scientists and engineers at that facility would be looking for jobs elsewhere.

● (1035)

The Chair: Thank you, Mr. Banks, and thank you, Mr. Bains.

To the Bloc Québécois, Madam Brunelle and Monsieur Ouellet, you're splitting the time.

Go ahead, please, for up to seven minutes.

[*Translation*]

Ms. Paule Brunelle: Thank you, Mr. Chairman.

Mr. Banks, you have a series of recommendations for government, including recommendation 2b. that reads as follows:

> detailed planning of a new multi-purpose reactor for research and isotope production that can take over and expand the functions of the aging NRU reactor over the long term.

Do you plan on using what was developed under the MAPLE projects? As you know AECL abandoned these reactors in 2008. Yet, some witnesses have told us that MAPLE projects could work.

Is there a relationship between the MAPLE projects and the new reactor you are recommending?

[*English*]

Mr. Daniel Banks: In our report, we did not address the MAPLE issue. I'm not a technical expert on the issues involved in the MAPLE reactors, but we do recognize certain key points about the MAPLEs. They were supposed to be a dedicated facility for medical isotope production only—and not even every medical isotope, but certain ones.

What we're concerned about is that broader picture. The MAPLE reactors would not really help us meet that broader picture because it would not allow us to do nuclear R and D in core in a research reactor. It would not produce some of the other isotopes such as cobalt-60, which is also used for cancer treatment. There are other isotopes for industrial purposes. There's also the advanced materials research with neutron beams that goes on with the multi-purpose reactor. All of these functions would not be met with the MAPLE reactors.

Regarding the possibility that there may only be 10 years left in the isotope market, there are of course different opinions on that. Just supposing it is the case, we strongly feel that the new multi-purpose reactor would justify its costs on the basis of the other missions. Canada would still get a strong return on its investment in that facility regardless of what happens with the isotope market. That's why we're focused on that.

It would be a new facility more like the NRU reactor at Chalk River, not like the MAPLE reactors. There's quite a significant difference in design. The NRU reactor is an extremely flexible machine. That's something that has to be built so that we can anticipate and respond to the needs of the future. When the NRU was built, we didn't even know the medical isotope market was going to be important, but because it was built flexibly and for multiple purposes, we were able to take advantage of that market and improve the health of Canadians.

The Chair: Go ahead, Monsieur Ouellet.

[*Translation*]

Mr. Christian Ouellet (Brome—Missisquoi, BQ): Thank you, Mr. Chairman.

Mr. Meyer, did you mention that you could now use natural uranium? Do you think that you will save more lives than those that would be compromised through this production? In other words, uranium extraction and its waste are very dangerous. It follows that we may lose more lives to uranium extraction and due to the production of uranium waste than the number we would save—

● (1040)

[*English*]

Mr. David Anderson: Garbage.

Mr. Christian Ouellet: I'm sorry; can I ask my question?

The Chair: Go ahead, please, Monsieur Ouellet. Continue.

[*Translation*]

Mr. Christian Ouellet: Do you think that we will save more lives by making isotopes with natural uranium than we will lose, in any case, because of the extraction of uranium?

[*English*]

The Chair: Mr. Meyer, go ahead, please.

Mr. Tim Meyer: Thank you for the question. It's quite apropos.

The quantities of uranium used to produce isotopes are quite small. We're talking about very small quantities. The natural uranium can be sourced from anywhere around the world; I pointed to Saskatchewan as one of Canada's repositories. The technology we're describing actually produces the same types of isotopes that are currently produced from isotope production reactors, so it's the same distribution of isotopes.

As to whether these isotopes in demand by the clinical and medical community save more lives than are risked in the mining of uranium, I confess I'm not an expert on weighing those costs and benefits. However, I can point to the continued basis for the demand for molybdenum-99 and its derivative, technetium. We've heard experts say that's very important to the clinicians, so those doctors are making those calculated judgments.

[*Translation*]

Mr. Christian Ouellet: Thank you.

Mr. Banks, you said that nuclear energy is clean, which really surprised and shocked me, because nuclear energy is being seen less and less as clean energy. But let me come back to the MAPLE project issue. Was the MAPLE installation's construction not abandoned because Canada had lost all of its good technicians, researchers and engineers? Nuclear power had been abandoned in Canada, and the experts emigrated to the United States and Europe.

Is it not true that there are only inexperienced people at Chalk River? This would be the reason why MAPLE did not get off the ground, because the project could not be realized.

[*English*]

The Chair: Dr. Banks, go ahead.

Mr. Daniel Banks: My impression of the MAPLE reactor is as being largely a production facility as opposed to a research and development facility that facilitates the training of many scientists and engineers. There would have been many nuclear engineers working on the MAPLE reactors. I'm not really an expert on that point.

Your question is about the loss of expertise at Chalk River. There is a sense that Chalk River Laboratories is not what it was, say, 20 years ago. There were more diverse research programs going on at Chalk River about 20 years ago. Over time, the core mission of the facility has gradually narrowed onto pretty much exclusively CANDU technology; that has come at an unfortunate cost of general research, and that has led to a loss of certain expertise. There was a particle accelerator there at one point that was called TASCC—

[*Translation*]

Mr. Christian Ouellet: Could you answer my question? In my opinion, nuclear energy is not clean energy. I do not understand how you could say that, when we know that people who mine uranium die from it, that waste is abandoned on site and that it has to be cleared away later on. Moreover, plutonium and other radiations can be produced from nuclear installations. It is not clean energy.

[*English*]

Mr. Daniel Banks: I've heard the label “clean” used for nuclear energy, often in the context of greenhouse gas emissions. It's one of the lowest emitters of greenhouse gases of all of our possible energy sources. That is not to say there aren't any other issues with it, but as far as the nuclear waste goes, from what I understand we have the expertise and capability of handling those materials over the long term.

As far as I know, the nuclear industry's safety record, as far as losses of life and accidents go, is actually one of the lowest of all energy industries in Canada.

● (1045)

The Chair: Thank you, Dr. Banks.

Merci, Monsieur Ouellet.

We'll go now to the New Democratic Party, and Mr. Hyer, for up to seven minutes.

Mr. Bruce Hyer: Thank you very much.

I have two questions for Mr. Meyer, and one to Mr. Banks. If you could all be punchy, it would help a lot to get through the seven minutes.

Mr. Meyer, it's my understanding that there is a so-called PETNET network in the United States of 47 PET facilities across the U.S. that have greatly reduced their need for the older technologies that are reactor-based, that we've been talking about, and for the isotopes that come from them. Is that true?

And if it's true, what role would you see your TRIUMF network having in building a national cyclotron network here in Canada?

The Chair: Mr. Meyer, go ahead.

Mr. Tim Meyer: Thank you.

Certainly there is a network of PET isotope generators and cyclotron centres in the U.S. That is a robust network and it does supply a lot of the clinical demand.

What we envision...and this is part of a national discussion. TRIUMF had 16 major medical centres attend a conference in October 2007, where we actually discussed this topic of how you could put up a national network to coordinate development of isotopes, to share the clinical expertise, and to provide a coordinated clinical trials platform for new products.

The role that TRIUMF has is really as a research and development leader. We actually have expertise in all of the areas. Our view is that over the next 10 years it's fairly likely that Canada will move to a network of PET isotope producers. In fact, we're developing something we call the “espresso-maker”. It would be isotope on demand, single-patient doses that would be placed in every hospital for under a million dollars. That's certainly the direction we see the country headed. It's not going to be here tomorrow and it's not going to be here the day after that.

Mr. Bruce Hyer: That's a great segue into my second question.

We MPs have a variety of functions. We have to look out for the planet, we have to look out for Canada, but we also have to look out for our constituencies, our ridings, our cities. In Thunder Bay we have a cancer centre, we have a regional health sciences centre, and we have a teaching university there. We're a really logical place for a new cyclotron. We have acquired a new PET scanner for the cancer centre there. But we need a cyclotron.

Minister Clement has apparently claimed to have put some new money into TRIUMF. It's my understanding that a lot of this was old money that's recommitted. It's a little vague as to where that money is actually going to go.

Thunder Bay has applied for it, but it hasn't heard about the feedback on an $8-million request for a cyclotron for Thunder Bay, which is one of those remote areas that needs those short-life, half-life materials for a very large region.

Do you know exactly where that $220 million for TRIUMF is going? What's your sense of where that $220 million is allocated? Is it all allocated? And will it provide for some of these new cyclotrons in remote areas like Thunder Bay?

Mr. Tim Meyer: Thank you. That's an excellent question. There are actually a couple of topics there.

First of all, TRIUMF has licensed its cyclotron technology to a company in Richmond, British Columbia, known as Advanced Cyclotron Systems Inc. I'm not an expert on their business negotiations, but I believe they're in the process of selling a TRIUMF-designed cyclotron to Thunder Bay. We've had representatives of TRIUMF in Thunder Bay to discuss cyclotron technologies and how to grow that. Actually, I believe that's an excellent example of how the distributed model of producing isotopes can make a difference.

We're in similar discussions in Prince George with UNBC about how to deploy a cyclotron there.

With regard to your question concerning the $222 million, we certainly do know how it's allocated. It covers a variety of research and development programs focusing on particle physics, some nuclear science, this new accelerator technology, and a mainstream nuclear medicine program.

TRIUMF is a publicly funded enterprise, so we're not in a position to contract and sell equipment to Thunder Bay; however, we are the technical backstop for the existing Canadian providers of that. So we look forward to having Thunder Bay join the nuclear medicine network as one of the leaders of both practice and research.

● (1050)

Mr. Bruce Hyer: Thank you very much.

Mr. Banks, I'm beginning to understand why the current government has been interested in privatizing AECL and is concerned about the significant costs associated with it. On page 4 of your report, you talk about recovering full costs at the end of about a decade. In large degree it sounds like yesterday's technologies, but maybe I didn't understand what I heard today.

Will your full-cost accounting over the longer term include the investment subsidies over that decade? Will it include the capital costs? Will it include the interest on those capital costs? Will it include the costs of waste storage? Do you yet have a business plan that this committee or other interested parties could look at to analyze your numbers?

I'm looking forward to a short response now, but a bigger response would be appreciated.

Mr. Daniel Banks: I apologize for that paragraph being confusing, but the reference to 10 years was to mean that it may take a decade or so to actually set up and implement the vision that we're talking about.

When you're talking about recovering full costs for things like isotope production, you recognize that you have waste management issues and costs of processing the isotopes on site. All those costs are unique to the isotope production mission, so all of them have to be recovered; otherwise, you're subsidizing that mission.

The NRCan expert review panel specified that you'd recover about 10% to 15% of your reactor costs from isotope production. That's where the multi-purpose nature of the facility is an advantage, because when you're looking at capital operating costs, you divide them among the various missions. You're not recovering all those costs necessarily from that mission; most of those costs are in support of, or would be recovered through, the other missions.

However, all the costs that are unique to isotope production have to be covered. We're not in a position to present the business plan, per se, of how all that would work, but we do know that the costs of production are only about a tenth of the end user market price, so there's significant room to grow without greatly affecting the end users if the business model around that changes.

We mention informally that in order to recover those costs, there would be an increase in the price by a factor of about three at the production standpoint. Essentially what we're saying is that whatever those costs are, let's charge it. We're not in a position to do the calculations and determine that it's going to cost a certain amount and then what the price would be; whatever the price is, let's charge it. That's operating on a sound business model.

The Chair: Thank you, Mr. Hyer.

We go finally to the government side and Mr. Anderson, for up to seven minutes.

Mr. David Anderson: Mr. Chair, I want to split my time with Ms. Gallant a little bit later.

First of all, I think I can assure Mr. Ouellet, the committee, and Canadians that there's no equivalency between the minor risks involved in mining uranium and the tremendous benefits that we've all experienced from nuclear power production and the medical treatments related to uranium. He can be assured of that.

I have two questions that I want to ask, and then I'll turn it over to Ms. Gallant.

Mr. Meyer, I was going to ask you what the new future is, as I asked last hour, but you've clearly laid that out. What I would like to know is where the resistance is to the shift in technology. When things move from something that's been done for 40 or 50 years to a new technology, where's the resistance there? Could you talk about that for a couple of minutes?

I'll actually ask my second question at the same time. Can you explain to us how a PET scanner actually functions? I think there's been some interest around the table, from what I've heard. Can you lay out how it actually works for us?

● (1055)

The Chair: Go ahead, Mr. Meyer.

Mr. Tim Meyer: Thank you. That's an excellent question.

There are philosophers of technology and science who will say that any true substitution for basic logistics takes generations, because those of us who grew up with one technology have to retire out of the workforce. I mean, retiring a steam engine in the coal-fired power plants certainly takes time. We've been working on the hydrogen highway for how many years? Hybrid cars are part of that bridge.

So I just want to point out that the resistance to moving from technetium-based SPECT technology, which I will define in a moment, toward the next generation of PET technology is not bottlenecked with any particular element of the business practice or the clinical practice. It's really the precautionary movements about the medical community and the regulatory bodies, which are serving the best interest of Canadians.

What we're saying is that we are at that cusp where the future technology is going to become the predominant element. The challenge with PET technology, as we've heard from the previous experts, is that right now it's twice as expensive to obtain the imaging equipment in the clinic. That's a challenge for health care systems that have burgeoning costs. However, the payoffs of using that technology would be tens of thousands of dollars per patient if fully implemented. That's where it takes these cancer care delivery agencies in Quebec and British Columbia and some of the other provinces to really push the envelope.

Other challenges within the medical community are establishing the correct basis for prescribing the new types of scans. Doctors like Sandy McEwan at Cross Cancer Institute are some of the pioneers in that area of looking at how to integrate that fully into the clinical practice.

My view is that resistance is really.... It took me a long time to learn how to program my VCR. That's both my fault and the fault of Sony and Panasonic for having complicated instruction manuals. But now I do it from the web.

The second point is how a PET scanner actually works, and whether that influences this resistance in adopting the new technology.

As I said, there are physics, chemistry, and biology here, and the basic difference here is in the physics. When we talk about a medical isotope, we're talking about an unstable, or some would say a radioactive, atom. There's a nucleus, and it decays by emitting a particle. In the technetium-based imaging products, we have a nucleus that decays and emits a photon, which is a small particle of light that exits the body and can be picked up by a camera.

In PET isotopes, “P” is for positron. When a PET isotope decays, it emits a piece of antimatter. It's an anti-electron. When that anti-electron annihilates, as we all know from *Star Trek* and *Angels and Demons*—Tom Hanks has not yet come to TRIUMF—matter and antimatter annihilate. When that positron meets its neighbouring electron within a few micrometres, it annihilates and what's emitted are two photons. So already the physics is different. One medical isotope of technetium gives you one photon; one medical isotope of a PET isotope gives you two photons.

Now, there's an advantage there, which is twice the count rate, but also some physics governs the emission of those photons, so you have a lot more information about the geometry of where was that medical isotope.

That's the basis of scanning. It's identifying where is the medical isotope.

The Chair: You have two and a half minutes.

Mrs. Cheryl Gallant (Renfrew—Nipissing—Pembroke, CPC): Thank you, Mr. Chairman, and through you to our witnesses.

I was most interested in hearing how the project through CREATE and the TRIUMF project are more complementary than in competition. Now I better understand that TRIUMF's focus is the medical community, whereas the multi-purpose reactor, yes, it can make isotopes—it was never intended to—and does it very well, but it also services the nuclear industry as well as material science. It was through that general science that we spun off a whole new industry, which is spinning off the different science we're seeing at TRIUMF, not only in aeronautics, but we've seen bubble technologies, all the jobs there, as well as the new materials that will give rise to the yet unanticipated jobs of the future.

There seems to be a tendency for people to be distracted by the unproven technologies like the MAPLEs. Have you seen this business model? You're talking more than just about a multi-purpose reactor from the CREATE standpoint. You're talking about an entire national laboratory with that as the first piece of the puzzle, so to speak. We did have the particle accelerator, but that was left by the wayside and would have complemented it. Have you seen the model in existence, and if so, can you tell us whether or not it's successful and how it's working?

● (1100)

Mr. Daniel Banks: When we were considering the model we propose, we did look at some other facilities. Gord was actually able to go down to visit Oak Ridge recently.

One of the models we looked at, the Canadian Neutron Beam Centre at Chalk River,was actually on a smaller scale. It is an exception to Chalk River as a whole. The Canadian Neutron Beam Centre is operated by the National Research Council as opposed to AECL, so understandably it has a different mission. Its mission is to be a national science facility.

The model there is roughly 60% in direct support from the National Research Council and 40% revenue. That revenue comes from two streams. One is from industry, because industry pays cost-recovery fees for access to the neutron beams to get information about the industrial components they need for their businesses. It could be an airplane turbine. It could be steel that's going to be used in bridges. The *Challenger* space shuttle is a famous example. They sent a piece of that to Chalk River for analysis.

In addition to revenue from industry for proprietary research, there is academic research. NSERC pays a significant portion, as well, to maintain the facility in a state of readiness for access by scientists from universities all across Canada. External sources, such as universities and industry and other government research programs, use 80% of the beam time.

Scaling that up to Chalk River, we think that the 60:40 model is probably still reasonable. There would be a heavy weight toward the industrial side of that revenue. As an example, a representative of AREVA testified at this committee not too long ago. I remember him saying that they spent $1.2 billion last year alone on research and development. The nuclear research and development market is a big area. Opening the lab to business from other industries, besides the current CANDU business of AECL, could certainly generate a lot of revenue.

The Chair: Thank you, Dr. Banks.

Thank you, Ms. Gallant.

Just before the members leave, we have the budget for paying witnesses' expenses to approve. If you could just hang around, it should literally take a few seconds, I would assume.

I'd like to thank Mr. Meyer, Mr. Tapp, and Dr. Banks for being here today. We appreciate your input very much. It's very helpful to the study.

I will now bring the budget before the committee.

Yes, Mr. Regan.

Hon. Geoff Regan: Maybe after that, can we also find out who we have as witnesses on Tuesday?

The Chair: Sure.

Hon. Geoff Regan: Thank you.

The Chair: The budget is for $15,950 for witnesses' expenses for this study we're working on right now. Is there agreement to pass this budget?

Some hon. members: Agreed.

The Chair: The witnesses for next Tuesday that have been approved are Peter Goodhand—I'm not sure where he's from—Philippe Hebert from Covidien; and Hugh MacDiarmid from AECL.

Go ahead, Mr. Anderson.

Mr. David Anderson: Can I just make a point? I think we have asked every witness who was put forward, with the exception of two people from the expert review panel. We asked the chair, and I think the other person was an alternate. Everybody has been asked. Some people have declined. Some of the companies have declined. We've done the best we could.

The Chair: We have....

Hon. Geoff Regan: Surely it's the chair and the clerk who do this, not the PS.

● (1105)

The Chair: It is.

Hon. Geoff Regan: Thank you.

The Chair: We have asked all the witnesses.

Of course, I keep in touch with members on the government side as well.

Hon. Geoff Regan: As well—in addition to members on the opposition side, I'm sure.

The Chair: Absolutely.

Thank you all very much.

We'll see you on Tuesday.

The meeting is adjourned.

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