House of Commons
CANADA

Standing Committee on Natural Resources

RNNR • NUMBER 026 • 2nd SESSION • 40th PARLIAMENT

EVIDENCE

Thursday, June 11, 2009

Chair

Mr. Leon Benoit

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● (1530)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): Good afternoon, everyone. It's good to see you again.

We're here today with two sections to our meeting. For the first hour we'll continue with our study on the Atomic Energy Canada Limited facility at Chalk River and the status of the production of medical isotopes. In the second hour we will complete, hopefully, our report on integrated energy systems. That will be an in camera session, but we are televised here for the first hour.

We have with us today three different groups. I'll have each group present for around ten minutes and then we'll go to the questions and comments from members.

If we could start right way, we have MDS Nordion in the first group. We have Steve West, president; Jill Chitra, vice-president, strategic technologies; and John Campion, legal counsel, Fasken Martineau law firm.

I understand that Mr. West will be making the presentation for MDS Nordion this afternoon. Go ahead, please, for up to ten minutes.

[*Translation*]

Mr. Steve West (President, MDS Nordion): Thank you very much.

Good afternoon. My name is Steve West, President of MDS Nordion. Accompanying me are Jill Chitra, Vice-President of Strategic Technologies, and John Campion, Counsel to MDS Nordion.

Today, the world's medical isotope supply relies on old and unpredictable reactors.

[*English*]

The medical community lives on a knife-edge every day, and will continue to do so until we resolve this issue.

The reason for the current supply shortage is AECL's decision to cancel the MAPLE project. Had the MAPLE project been completed, as originally planned, in 2000, Canada would not be in this predicament today.

The MAPLE reactors were designed to fully support the world's demand of the nuclear medicine community and the patients they serve. While there are other reactors in the world, none of them alone or together can meet the world's needs reliably.

The MAPLEs are state-of-the-art reactors. Their sole purpose is to produce medical isotopes. The MAPLE reactors are complete and await final commissioning. The MAPLEs have created isotopes. The MAPLEs can and should be brought into full service. We recognize that this requires external expertise, and we are urging the government to reconsider its decision to stop the MAPLE project.

The MAPLE project is Canada's opportunity for medical leadership and scientific innovation. The cancellation of the MAPLE project is a loss to Canada.

The Government of Canada agreed with AECL's decision to abandon the MAPLEs. It was not a reasonable public policy for Canada or for the world. It was the wrong decision. It was wrong for global long-term supply of medical isotopes, it was wrong for the patients who rely on this vital product for the treatment of cancer and heart disease, and it was wrong for the future of scientific innovation in Canada. It was a mistake in public policy.

Now I would like to emphasize four key points.

First, let me begin with the role of MDS Nordion in the nuclear industry. MDS Nordion is an Ottawa-based life sciences company with more than 600 highly skilled employees at locations in Ottawa, Laval, Vancouver, and Belgium.

Nordion is a business unit of MDS Inc., a Canadian global life sciences company headquartered in Ontario that provides products and services for drug discovery and development. In 2008 MDS undertook $156 million of R and D in Canada.

Innovation is critical to our success. Over the past two years, MDS Nordion has attracted more than $20 million in R and D to Ottawa and Canada through its various collaborations.

The NRU shutdown is having a significant impact on medical isotope production and Nordion's ability to supply medical isotopes to the nuclear medicine community. This shutdown is also having a negative impact on MDS Nordion's and Canada's reputation as world leaders in isotope supply.

My second point addresses our view of the current medical isotope shortage. The current shortage arose on May 18, 2009, when AECL announced that its NRU reactor would be out of service for more than one month. As that now stands, it's more than three months.

The NRU reactor is one of five reactors in the world capable of producing large quantities of isotopes. The second-largest producer is the Petten reactor in the Netherlands, which accounts for 30% of the world's supply. It was also shut down recently due to a water leak. It has been announced that the Petten reactor will be shut down for five to six months early next year to repair that leak. This reinforces my earlier point, that the current reactors are old and they are unreliable.

● (1535)

Given these facts, how could we not reactivate the MAPLE project? It is the only prudent decision to provide secure supply for the medical community. Why would you not restart the MAPLEs for the well-being of patients worldwide?

My third point addresses MDS Nordion's commitment to stable medical isotope supply, short and long term. In the mid-1990s, MDS Nordion recognized the serious nature of the aging global reactor infrastructure and contracted with AECL to construct and bring into service two nuclear reactors and a processing facility. This agreement came to be known as the MAPLE project and was intended to secure a long-term supply of medical isotopes.

AECL agreed to build the MAPLEs—originally slated to be operational in 2000—for $145 million, to be fully paid by MDS Nordion and at no cost to the taxpayer. The MAPLE reactors were intended to replace NRU.

On May 16, 2008, AECL and the Government of Canada unilaterally announced that the MAPLE project would be discontinued. They did so without providing a long-term plan for the supply of medical isotopes beyond an intent to extend the licence of NRU to 2016. This strategy clearly does not work. It abdicates Canada's current leadership position and it creates a vacuum.

MDS has invested $350 million in MAPLE. MDS has filed a court claim against AECL and the Government of Canada to bring the MAPLE facilities into service. The solution to the global medical isotope supply crisis is here in Canada. Both MAPLE 1 and MAPLE 2 and the processing facility are 100% constructed. The MAPLE reactors worked and have achieved important milestones, including the creation of isotopes.

It is inaccurate to suggest that the MAPLE reactors did not work. A number of international experts have publicly said that the MAPLE project could be completed and be brought into full service. We believe that with the assistance of nuclear experts the MAPLE facilities could be producing medical isotopes for the benefit of patients worldwide.

It is worth noting that despite our requests, the Government of Canada has chosen not to include MDS Nordion in its discussions and working groups on solutions to resolve this medical isotope crisis. With over 60 years of experience in the medical isotope industry, MDS Nordion is well positioned to add value to these discussions.

My fourth and final point addresses the impact of the reactor crisis on Canada's leadership role in the future. Canada has been a leader in isotope production and has fostered an innovative industry that creates high-value Canadian jobs. As Canada strives to maintain a leadership position in science and technology, it is critical that we focus not only on the requirements of today but on the advancement of nuclear medicine for tomorrow.

Medical isotopes are the foundation to advance research for improved drug discovery and development. They are our pathway to personalized medicine—enabling health care professionals to improve lives through targeted imaging and targeted therapy, thereby providing medical diagnosis and treatment specific to an individual.

To advance health care technology for Canadians, we need new medical isotope production capacity. Secure, long-term isotope supply assurance has been and continues to be a fundamental requirement for the global nuclear medicine community, the patients they serve, and the future of innovation in health care.

● (1540)

Let me repeat, the solution is here in Canada. The solution is clear. The solution is MAPLE. We urge the government to change public policy and restart the MAPLE project.

Thank you.

The Chair: Thank you very much, Mr. West, for your presentation today.

We go now to the next witness, from the University of Laval, Professor Michel Duguay, from the Department of Electrical and Computer Engineering.

Thank you very much for coming today, Monsieur Duguay, and please go ahead.

Professor Michel Duguay (Department of Electrical and Computer Engineering, Laval University): Thank you for the invitation.

I'd like to give a few points of information about my background. I have a PhD in nuclear physics from Yale University. I've had two careers, a 21-year career at the AT&T Bell Labs in New Jersey, during which I spent three years at the Sandia National Laboratories working on high-power laser projects. Over the last 20 years I've been a professor at Laval University in the Department of Electrical and Computer Engineering. So this is my second career in Canada. I spent a total of 26 years in the United States. For ten years in the United States I was part of the energy policy committee of the Institute of Electrical and Electronics Engineers. We used to meet in Washington about every two months, and we discussed all aspects of energy, including nuclear power.

I often asked my colleagues, some of whom were nuclear engineers, what they thought about the Canadian reactors, and they were not impressed because they thought the Canadian reactors had all these tubes that were exposed to a high neutron flux and became very fragile and were subject to bursting. When I came to Canada and I was invited by some ecological groups to look into nuclear power, I looked at it very critically. Many people have asked me what competence I have in nuclear power in Canada, and I can tell you that I have read 4,000 pages of documentation from AECL and from the CNSC, and I have understood those 4,000 pages.

One thing I've noticed in the documentation from the CNSC and the AECL is that the weakness, the basic flaw in the CANDU design, as was apparently in the MAPLE design, is this positive coefficient of nuclear reactivity. If a tube bursts, as it did in Pickering A in August 1983, the pressure goes down, because the water is at a very high temperature, 310 degrees Celsius. Bubbles form immediately, and that positive coefficient means that nuclear reactions are accelerated. So there can be a power spike, which, according to the CNSC, can increase the nuclear power, the thermal power, by a factor of 10 in a matter of one second. So the nuclear reactor at all times has to be under computer control, because only computers can react to a complex problem within half a second. So all those reactors are under computer control, and when sometimes the sensors give wrong information to the computer, you can imagine what can happen.

I happen to be a fan of Linda Keen. I have high admiration for the work that she did at the CNSC. Under her watch the CNSC brought their regulations up to the international level, and these new regulations were adopted formally in Ottawa on June 10, 2008. You should know that all the CANDU reactors in Canada don't meet the new regulations. That is why Ontario Power Generaton has been hesitating about refurbishing the four reactors at Pickering.

Regarding what my colleague Steve West said, I apologize, I have to disagree. I was at the CNSC hearing in Ajax on December 10 last year, and Bill Pilkington, the vice-president of AECL, said the following on page 14 of the transcripts:

> I would just like to point out that the MAPLE reactors have never actually produced isotopes, and our assessments would say that they would not have been capable of producing isotopes for many years into the future.

I'll switch now to a second part of my presentation. I worked for my PhD with a linear electron accelerator that uses microwave cavities to accelerate electrons, and it so happens that there's a very interesting proposal, as I'm sure you're aware of, that comes from the TRIUMF group in Vancouver to use electron accelerators to produce technetium-99 isotopes. The TRIUMF-UBC group already produces isotopes for MDS Nordion by other techniques, other ions, not technetium.

● (1545)

They have a considerable report showing that they could easily produce as much technetium as you want by constructing perhaps half a dozen linear electronic accelerators. I think their proposal is very sound, and these accelerator groups—of which I was a part for three years when I was at Yale University—have always delivered. They've made these huge accelerators in the States, France, and different places in the world, and they work extremely well.

People on the nuclear side have not always delivered. In the States there are 104 nuclear reactors in operation, some of which are highly controversial. But 117 nuclear reactors were stopped during construction or after construction in the United States for various reasons. The nuclear reactor people don't have the track record of the people in the accelerator field. Although I haven't studied this topic to its greatest depth, I would at least look favourably at this proposal by the TRIUMF group, and call on your committee to study it further.

Thank you.

The Chair: Thank you very much for your presentation, Mr. Duguay.

We will go now to our third witness, Mr. Waddington, for up to ten minutes, please.

● (1550)

Mr. John Waddington (Nuclear Safety Consultant, As an Individual): Thank you, Mr. Chair.

Good afternoon, ladies and gentlemen. Thank you for asking me to reappear before you.

My name is John Waddington. I'm a professional engineer. I have spent over 40 years in the business of nuclear safety. I retired from the Canadian Nuclear Safety Commission in 2002 after 27 years with that organization. Since then, I have provided consulting services in matters of nuclear safety to various Canadian organizations, including AECL and the IAEA. I am appearing before you as a private individual.

Following a brief discussion with your chair and your staff, I thought it might be useful to give you my views on the question of whether the MAPLE reactors could be restarted to make radioisotopes. I have structured this presentation in the form of questions you might ask and my answers, as it seemed to be the easiest way to do this.

The first question is whether the MAPLE reactors could be restarted. The answer, in principle, is yes. But there would be many steps, and much human and financial effort would be needed and would need to be completed before such a direction could be successful.

Perhaps I could just refresh your memory a little as to why the MAPLEs were shut down. The first MAPLE, as was previously mentioned, was operating at power, though it was not producing radioisotopes at that time. It was in commissioning, when it was observed that its operating behaviour was not exactly as expected, when the reactor power was changed from one level to another. Although the difference between its observed behaviour and its expected behaviour was not large, it was significant, in that the reactor core was slightly more reactive at higher powers than at lower powers instead of being less reactive, as the original design intended it to be. The major difference, though, was not so much the change in the power coefficient of reactivity. It was the fact that there was a difference, a discrepancy, if you wish, between prediction and observation. In nuclear safety, the designer, the operator, and the regulator all expect a very high degree of correlation between analytical predictions of how a reactor operates and the measured observations of that operation. In other words, in the Nuclear Safety Commission, we expect the design and the operation to deliver what they said they were going to deliver.

After the expenditure of a very substantial effort by AECL, using very competent engineers and scientists, they could not find the reason for that discrepancy. They found some reasons for it, but they were not able to fully explain it, and the further steps needed to resolve the discrepancy were not readily apparent. Before the MAPLE reactors could be restarted, that discrepancy would still need to be explained to the satisfaction of AECL, as competent operators who are very conscious of the safety of the reactors, and of course to the satisfaction of the CNSC. And of course a licence would have to be applied for and granted by the CNSC. In my view, it would take likely a lot more time and effort to nail that discrepancy to the ground.

The second question you might ask is whether it is possible that the reason for the discrepancy could ever be found. My answer is yes. Given enough resources—there are some very smart engineers and scientists around—I would expect that AECL, together with support from the international community, would find that reason in time. However, the question remains: how much time and effort would be needed, and is it possible right now to estimate how much effort would be needed? The answer to that second question is no, it's not possible. A formal series of tests was put together using a very formal process of investigation, and it didn't come up with the answers. So we're starting from a head-scratching spot again, if I may put it that way.

Another question you might ask me is whether MAPLE could be operated safely with a small positive coefficient of reactivity. I would disagree with Michel here, and I would say that yes, it could.

● (1555)

Every reactor in the world has a positive coefficient for some accidents. In a PWR, it's a cold-water accident that puts a positive reactor in the core. In a CANDU reactor—or a power reactor, as Michel has pointed out—it's a loss of coolant accident; that is, the big pipe that would break. But every reactor in the world has some part of its design that, if put it into an accident condition, will result in a power increase. And the shutdown systems are designed to deal with that. In a CANDU reactor, there are two independent shutdown systems to deal with that.

Just as an aside, if Chernobyl had been fitted with a Canadian reactor shutdown system, there likely would not have been an accident at Chernobyl. That's just an aside.

So could it be operated safely with a small positive coefficient? Yes, but AECL would have to explain satisfactorily to itself and the CNSC what that discrepancy arises from before making the new safety case to the CNSC. Operation of a reactor with a small positive coefficient of reactivity would likely involve the operator moving the control rods that control the reactor more slowly than otherwise would have been the case. Obviously, if the power becomes more reactive as you increase power, you can control things a little more slowly to compensate. And I would expect that a successful prediction of observed reactor behaviour would be needed as an essential element in that safety analysis.

The question has arisen about an independent panel of experts. Could an independent panel of experts find the source of the problem? It is always possible that fresh eyes will see something that others have missed. I think that's evident to us all. Given the amount of effort that has been put in by AECL to date, and indeed by highly competent independent U.S. labs, a panel is also likely to take substantial time and effort, in my view. It would need additional experimental data to assist it in coming to a firm conclusion. So it's not going to be a simple thing. It's not a question of looking at the thing and saying “Eureka!” I can't see that happening.

The HANARO reactor in Korea generally works fine. Can't we learn from that? As I understand it, there was a significant amount of information transfer from HANARO to AECL while AECL was looking for the cause of the discrepancy. Well, the HANARO reactor works fine, so why doesn't MAPLE?

We don't know all the reasons for that. HANARO is a larger reactor than MAPLE, and of course it doesn't use the special high enrichment fuel that is used to make radioisotopes in MAPLE. I would expect, then, that since it's both larger and doesn't have this concentrated uranium in parts of the core, the neutron flux in the core would be a good deal less peaky. It's a good deal smoother in HANARO. In the MAPLE reactor, it's a very peaky process, which makes prediction of the reactor physics that much more challenging. And it does introduce different thermal stresses in the fuel of MAPLE that are likely not present in HANARO. However, whether these differences I've just outlined account for the difference in behaviour between MAPLE and HANARO is not clear. They are possible sources, but it's not clear.

Another question you might ask me is can HANARO be used to make medical radioisotopes? I can't see a fundamental reason why not. No doubt the Korean regulators would need a safety case to be made to them, and the Koreans presumably would need to develop and build a new processing plant to extract the moly-99. And I have no idea if Korea is looking at this possibility.

You may ask me if we have the right balance between nuclear safety and patient safety. You'd be asking me a question that I'm not really very competent to answer. I'm an engineer; I'm not in the medical business. And of course it is the most difficult question of all. The nuclear industry's designers, operators, and regulators seek a very high level of assurance of safety and a much lower level of risk to individuals and society from the operation of reactors than what is accepted in many other human activities. The medical industry is faced with a much more immediate life and death decision. So we have a clash here of quite different views of risk.

● (1600)

At the end of the day, Parliament may have to decide for itself what levels of risk are acceptable in a modern society, as you indeed did when you decided to instruct the NRU reactor to reopen 18 months or so ago.

The last question that I'd put into your mouths, if I may, is that some have said that the NRU will never start again. Will it? Personally, I think—in fact, I'm sure—it will. Corrosion is not an unknown phenomenon. The difficulties are finding the full extent of the corrosion, and that, of course, is a matter of inspection in a very difficult area, and then developing an appropriate method of repair, again in a physically very difficult area.

In addition to the need to produce radioisotopes, the long-term success of AECL's new power reactor design, the ACR-1000, is also dependent on timely experimental work planned to be done in the NRU. It seems to me that AECL's long-term future as a reactor designer of note—again, I would disagree with you, sir, on that, but we can discuss it later—the assurance of the long-term safety and economics of Canada's existing fleet of power reactors, and the continued development of a nuclear business in Canada depend on having a research reactor available for the supporting research that is needed to keep a complex machine running for 60 years.

At the moment, that means bringing the NRU back into service as soon as possible. In the long term, it means a replacement for the NRU will eventually be needed.

Thank you, Mr. Chairman.

The Chair: Thank you very much, Mr. Waddington.

We have heard all the presentations now, so we'll go to the official opposition, with Mr. Regan, for up to seven minutes.

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

Let me first thank the witnesses for taking the time to come here today. It's very much appreciated.

Mr. Chairman, perhaps you'll want to suggest to Mr. Waddington and Mr. Duguay a location where they could have dinner and have their discussion. I'm sure we could all think of some good restaurants for them.

Let me begin with a question for Mr. West.

Mr. West, let me ask you about why you think the MAPLE project was shut down. You've heard Mr. Waddington's views on that and Mr. Duguay's as well. What is your response to that? In particular, what is your view in terms of the reasoning behind and the influences of the players who brought about the decision to shut down this project?

Mr. Steve West: During the project and the regular updates that we were getting from AECL since we renegotiated our agreement with AECL in 2006, there had never been any indications that they wouldn't be able to complete the project. In the regular updates that AECL gave us, we felt confident that they would complete the project. When in 2008 the government and AECL made the decision to cancel the project, it might also have been based upon some assumptions, frankly, that might today prove to be dramatically different.

Just as Dr. Waddington has said, we also are looking for the best option at the lowest risk. The original strategy to replace NRU always was to have the MAPLE project, and I don't think that strategy has changed. The issue is on the execution of the strategy and the ability of AECL to execute.

Clearly, we don't have all the answers. Clearly, AECL doesn't have the answers. But we think there are experts who can resolve it. There are differences of opinion, but if I could, I'll quote to you something from the National Academy of Sciences, which visited Chalk River and looked at the MAPLE project, and which is a fairly august body of people with a lot of experts. I'm going to quote the report that was released in January of this year. The report states that "AECL could probably contract with another organization to fix the MAPLE reactors if it does not have the necessary in-house technical expertise or resources to do the work itself."

From that report, I'd like to also provide another quote from the committee: "The committee assumes that the worst-case scenario for fixing the MAPLE reactors involves the replacement of the reactor cores. The cost of such replacements would likely be small...in comparison to the cost of building a new reactor...."

● (1605)

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

You mentioned in your comments that you said a number of international experts have publicly said that the MAPLE project could be completed and be brought into full service. Are you able to provide us with a list of the names and perhaps some citations of those and where they've said that?

Mr. Steve West: Yes, I can. I've called on the National Academy of Sciences report. I can give you actually another one, which is an article that appeared in *Nuclear Engineering International* in October 2008, from Dr. Harold Smith, who is the ex-manager of MAPLE Nuclear Commissioning. He stated that "MAPLE reactor is probably the safest reactor design in existence, since it actually has three shutdown systems...." I think that's the point that Dr. Waddington was making as well. He also went on to say, "The MAPLE reactor operated like a dream, and was fully capable of meeting all objectives."

Hon. Geoff Regan: I don't suppose there are many Canadians who might happen to be watching the proceedings of this committee and who could necessarily understand the operation of a nuclear reactor. There are probably a handful, perhaps a few dozen in the country.

Let me ask you, Dr. Waddington, what's your view on whether Canada ought to be in the business of producing isotopes?

Mr. John Waddington: Thanks. May I just correct you? It's just Mr.; I'm not a doctor.

Canada invented, as I understand it, the whole business of medical radioisotopes. As you know, the NRU has been a very solid producer of radioisotopes for many years. We do have a long history of producing radioisotopes. I suspect, and Mr. West will undoubtedly give you the figures, it's probably a lucrative business being the suppliers of radioisotopes. Whether it's a lucrative business at the beginning of the production phase, it's not clear to me—that is, when you're running it as a reactor and you're producing material in the reactor itself. So whether there's an economic advantage, that I don't know.

One of the difficulties in producing isotopes, and this was a difficulty that MAPLE was intended to resolve, is when you do it in a research reactor, you are always having competing demands on that reactor, and this is the same for all the reactors around the world. Research reactors are designed for research, and the management process you put in for research is quite different. You hire the brightest and the best you can. You give them the greatest freedom you can to do their research. When you're doing something in production, this is a focused business. So there's always a problem there. Of course MAPLE was intended to solve that issue, which is one of the advantages of the MAPLE design originally.

Speaking as a Canadian, I would be very sorry to see us out of that business, given our history.

Hon. Geoff Regan: Thank you.

Mr. Chairman, I turn it over to my colleague.

The Chair: You have time for one very short question, Mr. Bains.

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

My question is actually very simple and straightforward. It's the question we've been asking in the House of Commons with respect to the supply of isotopes and what the current level is.

From your perspective, do you have any indication of what the current level of supply is of isotopes in Canada? The reason I ask is we were told that anything less than 50% is a matter of life and death. So I think that's of grave concern. We were trying to get a clear answer for that, and we've been told in the past that it's very difficult to estimate the supply. I was wondering if you had any thoughts on that.

Mr. Steve West: I can be accurate as regards to the supply of isotopes, and how you translate that into medical application is somebody else's expertise. With NRU down, there is a 30% shortage of isotope supply globally.

The Chair: Thank you very much, Mr. Bains and Mr. Regan.

Before we go to Madame Brunelle, you've been asked to produce some names for the committee, and I would also put the offer out to the other witnesses to bring forth names that they might have, either taking that position or taking a different position on the MAPLEs being brought back into operation in a reasonable time, at a reasonable cost. I appreciate any names that any of you would have on that.

We go now to the Bloc Québécois, to Madame Brunelle, for up to seven minutes, please.

● (1610)

[*Translation*]

Ms. Paule Brunelle (Trois-Rivières, BQ): Good afternoon, ladies and gentlemen. Thank you for being here.

Clearly, this is a tough issue that poses a big problem—as far as patients are concerned, of course.

Mr. West, I was shocked to hear you say today that the MAPLE reactor has previously produced isotopes. In 2008, the former natural resources minister told this same committee that after 12 years, no isotopes had been produced, and the minister said the same thing. My question is for you and the other witnesses. Who is telling the truth? Can it produce isotopes?

My other question is concerning safety. Mr. Duguay spoke about the weaknesses of the MAPLE and CANDU reactors. It has to do with radioactivity. As soon as we hear that, we have concerns about safety, as does the public. Can we really operate the MAPLE reactors safely?

Mr. Waddington, you said that it was indeed possible, but it would require a lot of different measures as well as financial resources. You also said that it would be hard to estimate the cost. That being said, would getting these reactors running mean sinking money into a bottomless pit? It would most certainly require a lot of time, as well. You previously suggested restarting the NRU reactor as a possible solution.

I have a variety of questions, as you can see, but they boil down to two fundamental issues. Can the MAPLE reactor really produce isotopes? And would we be compromising safety by restarting these reactors?

[*English*]

The Chair: First Mr. West, then Mr. Waddington.

Mr. Steve West: Thank you for the question.

We were surprised when the minister said that the MAPLEs had never produced isotopes. It does require a bit of a technical explanation, perhaps, so I'll ask my colleague, Ms. Chitra, to explain.

Mrs. Jill Chitra (Vice-President, Strategic Technologies, MDS Nordion): Thank you, Steve.

To give a little bit of my background, I've worked with MDS Nordion for 20 years. I'm a professional engineer and I've worked on the MAPLE project with AECL since its inception.

Medical isotopes are produced when targets are placed in a reactor. When the reactors are operating, neutrons impinge on the reactor and isotopes are created. AECL reported to us every month during the project from 1996 on milestones that were reached during the project. From 2000 to 2008, the MAPLE reactors ran numerous times at various power levels, up to 80% power.

During tests, targets were inserted into the reactor for a number of those tests. When targets are inserted in a reactor and it operates at power, isotopes are created; moly-99 is created. Those targets were not processed, because the processing facility was not yet finished commissioning. So targets are inserted in the reactor, the reactor operates, those targets could be removed and processed, and you would have medical isotopes for sale.

That's the explanation. It's one of the reasons we think that MAPLE has potential.

[*Translation*]

Ms. Paule Brunelle: Do any of our witnesses have any thoughts on safety?

Mr. Duguay?

[*English*]

Prof. Michel Duguay: As you know, nuclear reactor safety is very controversial. As an example, some power companies in the United States want to continue the operation of Indian Point near New York City, and the State of New York is suing the federal government to prevent the nuclear regulatory commission in the U.S. for allowing Indian Point to continue.

In Austria, a nuclear reactor had been completed. There was a referendum, and the overwhelming majority of the people decided not to put a nuclear reactor in operation.

The dangers associated with the AECL reactors have been recognized numerous times by AECL itself, in writing. They have said that the AECR, the advanced CANDU reactor, should have a negative coefficient of nuclear reactivity. They have not demonstrated it yet.

I think Mr. West said something very good only a few minutes ago. We should look for the best option at the lowest cost. When you go into the nuclear business, it's a complete unknown. Instead of taking two years to develop, it might take 20 years. Instead of costing $75 million, as the Shoreham nuclear reactor on Long Island was supposed to cost, it might end up at $6 billion, as it did, and it was never put in operation. Unfortunately, the nuclear reactor field is a minefield.

By comparison, the accelerator field is marvellous. It's taking us to the stars every day.

● (1615)

[*Translation*]

Ms. Paule Brunelle: Mr. Duguay, you talked about the Triumph particle accelerator. I would like to hear what our other witnesses think about that. Is it a plausible solution? Could it be effective?

Your comments on that were a breath of fresh air, Mr. Duguay. So we are hopeful that it might be an effective solution.

I would like to hear your thoughts on that, Mr. West or Ms. Chitra.

[*English*]

The Chair: Mr. West, go ahead, please, and then Mr. Waddington.

Mr. Steve West: Thank you.

We also share the same opinion as Mr. Duguay that the fission project has a good potential outcome to it. In fact, we ourselves are partnering with TRIUMF on that project. When the government and AECL announced the cancellation of the MAPLE project, clearly we had to look at other options that would be available to us. We continue to investigate other options, and that is one of the stronger options. We don't think it's the best option. We think that restarting the MAPLE project and finishing MAPLE is the best option. But certainly we're excited by the photofission opportunity, and from our discussions with TRIUMF we think this is a project that certainly merits further support.

The Chair: Mr. Waddington, you were asked earlier as well to respond on the issue of whether any medical isotopes had been produced by the MAPLE reactors. Could you answer that first, and then go on to the next question?

Mr. John Waddington: Certainly.

On the first question, you've already had an accurate answer from Ms. Chitra that the reactor had operated as part of its commissioning, and some of the commissioning tests were with targets in. But those targets were not processed, which is why I said it didn't produce any radioisotopes in terms of output. Obviously when you run a piece of fuel and you must take fuel critical in the reactor, isotopes are produced, and that is correct.

The Chair: Just for clarity for the committee, were there medical isotopes produced by the MAPLE reactors?

Mr. John Waddington: There would have been moly-99 as a fission product in the fuel in the reactor.

The Chair: But were any medical isotopes produced?

Mr. John Waddington: In terms of milking that fuel and getting the moly out so that it would then go in to become a technetium-99 generator, that was not done.

The Chair: Thank you. I just wanted clarity there.

And on the other question?

Mr. John Waddington: On the other question, you asked about safety, which is clearly of concern to you. The MAPLE reactors were safe throughout their operating history in terms of the commissioning tests. If they were not, they would not have been licensed, and they would not have been allowed to operate either by AECL or the CNSC.

There's a very high level of safety in those reactors, which was maintained throughout their operation, and I have absolutely no doubt that would be maintained throughout the rest of any further commissioning and any further operation. I have absolutely no question at all that the reactors are safe. I'd be quite happy to live next to them with my children and my grandchildren without a qualm, and that goes for any other major reactor today.

The Chair: Thank you.

Thank you, Madam Brunelle.

We go now to the New Democrats, to Mr. Hyer, for up to seven minutes.

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

Let me review what I think I've heard today. It's the opinion of Mr. West that without Canadian production of isotopes, there is no reliable production of isotopes globally, so if Canada doesn't stay in the game, somebody has to move quickly. I have a follow-up question on that in a minute.

Then I've heard opinions by three people on how we should produce those isotopes. Mr. West says fix MAPLE and get it going. Mr. Duguay says a much better method is to use linear accelerators, and Mr. Waddington says fix NRU. So we have disagreement on the answer to the question.

I'm not going to seek clarification on which of you is correct, but I would like to ask a question not only of Mr. West but anybody else who has information to bring to bear on the supply, because I'm not hearing a clear answer on the supply question. Just how short are we worldwide? What are the implications of what's occurring? What is the supply now? What is the potential for various timeframes in the future? And particularly, the minister has talked about a five-point plan to ensure the isotope supply. Do any of you know what that five-point plan is, and does anyone have an opinion on whether it can or will be effective?

● (1620)

The Chair: To whom is the question directed, Mr. Hyer?

Mr. Bruce Hyer: It's directed to anyone who can answer it.

The Chair: Mr. West, do you want to answer it first?

Mr. Steve West: We currently do not have any isotopes that we can process. NRU supplies 30% to 40% of world demand. There are four other reactors, and they don't necessarily operate all at the same time. For example, the Petten reactor, which has this water leak, will be down for the month of July.

Our estimate of the shortage is that it is around 30%. That shortage will vary by country or region. There may be less shortage, for example, in Europe. There is a much larger shortage, I imagine, in Japan, which relies primarily on Canada, and in Brazil. In North America we would estimate the shortage to be higher than 30%, probably around 50%. We have heard that there could be some potential increase in the supply. We've heard publicly from the government that the Petten reactor is going to increase output somewhat. That won't make up the difference. The Australians are talking about bringing their reactor on line. That's about 4% of world supply.

So when you add all those figures up, we're going to be in that 20% to 30% range for a long time, and we don't really have a strategy to deal with that.

Mr. Bruce Hyer: That's worrisome. My interest in this is not just academic or legislative. This week I had a critical medical test using several medical isotopes, so I'm one of those Canadians who is dependent, for health answers and health treatment, on medical isotopes.

Where do we go here? Does anybody want to add one more opinion—mild, strong, or otherwise? If you were the government, what path would take us to a sustainable and safe supply of isotopes?

The Chair: Mr. Waddington, and then Mr. Duguay.

Mr. John Waddington: The shortest route to getting the supply back is to fix MAPLE. Any of the other routes, whether it's restarting MAPLE or getting the Australian reactor producing more, is likely to take a significantly longer time than getting NRU back on line.

Mr. Blaine Calkins (Wetaskiwin, CPC): As a point of clarification, did Mr. Waddington say “fix MAPLE”?

Mr. John Waddington: I beg your pardon. I meant “fix NRU”. Thank you very much for clarifying.

The Chair: I think we all knew what was being said, but thank you, Mr. Calkins.

Mr. John Waddington: Yes, fix the corrosion in NRU, because fixing MAPLE will take some significant time and we don't know how long that will be.

The Chair: Mr. Duguay.

Prof. Michel Duguay: My colleague Mr. Waddington spoke eloquently about Canada's contribution to modern science in developing the medical isotopes, which is a very healthy business in several Canadian provinces. I think it would be a blow to the Canadian reputation, especially our scientific and engineering reputation, and even to the nuclear people in Canada, if we were to just drop the whole thing. It would be disastrous in every respect. So I tend to agree with Mr. Waddington that we should fix the NRU, because it has worked and can be fixed, and then look at other options, like the accelerator.

The Chair: Mr. West.

Mr. Steve West: I think fixing NRU is essential. I don't think it's the final solution, but it's essential in the short to medium term. If you look at all the options, bearing in mind the time it takes to bring on new infrastructure to create medical isotopes, the best option is to complete the MAPLE project. Maybe we ought to complete it under slightly different circumstances, or under a slightly different design parameter. That will take some creativity. That's why we're recommending bringing in a consortium of experts who can look at the options and pursue them in parallel.

● (1625)

The Chair: Thank you, Mr. Hyer.

We go now to Mr. Anderson, for up to seven minutes.

Mr. David Anderson (Cypress Hills—Grasslands, CPC): Thank you, Mr. Chair.

I want to thank the witnesses for being here today.

I've been a bit disappointed in what I've heard today, because some of us were on the committee last year and spent a fair amount of time on this issue.

Mr. West, I believe you know better than some of the things you're saying, because we've only heard part of the issues here. We really haven't heard anything about your financial interest in this whole matter, which is substantial. We have heard very little about the actual problem with the reactor.

Last year Mr. Waddington went through the actual functioning of the reactor. If you take a look at the testimony from June 10, 2008, there's an excellent explanation of how this whole thing works and how it doesn't work. It's very clear there are substantial problems that cannot be fixed. I hope we'll get back to that.

I just want to read into the testimony what a couple of our colleagues said during our conversation last year, because we'd spent a little bit more time on this.

Ms. DeBellefeuille from the Bloc said:

> Mr. West, this has more or less been a horror story from the outset. Half a billion dollars were invested in the MAPLE venture—we could actually talk about the MAPLE failure. And yet you continue to tell us that it would have been in the interest of the government, of taxpayers, and of your company to continue to invest in the MAPLE reactor. From what I understand, you do not agree with the government's decision to put an end to the MAPLE project. It is rather surprising that you should maintain this position. It seems obvious to me that this was not a good thing.

She said later:

> Mr. West, we are talking about a multi-million-dollar investment. Mr. Waddington told us that millions more would have to be invested by your company and by taxpayers in order to make the reactor work. At some point in time, you have to give up. It was a bad deal from the outset.

Mr. Alghabra, who was the Liberal critic at the time and was probably the member of the committee who was most familiar with nuclear reactors, said:

> Now, facing the difficulties at the MAPLE reactor—and I don't think we can deny that there are technical problems with the MAPLE reactor—I'm at a loss.

I think the government members at that time would have agreed with those statements as well.

Mr. West, I want to challenge your statement that you said at the beginning here, “The reason for the current supply shortage is Atomic Energy of Canada Ltd.'s decision to cancel the MAPLE project”. Are you actually suggesting that if this project hadn't been cancelled last year it would now be up and running, in spite of the fact there were problems that had no apparent solution at that time? Is that what you're saying?

The Chair: Mr. West, please.

Mr. Steve West: Thank you.

Yes, if you recall what I said last time, it was that we were surprised that the MAPLE project was cancelled, because AECL had never indicated to us that they would be unable to complete the project. My opening comments—

Mr. David Anderson: You knew there were problems, because in the testimony it talked about the fact that you were aware from 2003 to 2006 to 2007 that there were problems with that. I think you've used this as an excuse that AECL didn't tell you they were going to shut this down, but the reality is you knew there were problems.

Are you telling me those problems would have been fixed by now and that it would have been up and running at this time and would have been taking care of the supply? That's what your statement says. That's what Canadians have heard. If that's not accurate, I think you need to withdraw that statement.

Mr. Steve West: Sir, we were very clearly informed by AECL that they would meet their contractual obligations to bring the MAPLEs online. The original target date was October 2008. We expected them to complete the project and meet their contractual obligations.

Mr. David Anderson: I think that actually, probably, what you did say last time is more accurate. That is, you said, “Part of your question is about the technicalities of operating reactors, and I would probably say that we are not the experts....”, and I think you've indicated that. The reality is this thing would not have been up and running, because there was no apparent solution.

I'd like to go back to Mr. Waddington's testimony, where he talked at length about the number of people who had been committed to trying to find a solution to this problem. He talked about AECL “using a panel of their most experienced staff and outside help”, finding 200 potential factors that could have been causing the problem. He said, “They also asked the Idaho National Laboratory in the U.S. to do an independent prediction of the behaviour....”, that it “employs some of the very best reactor physicists in the world, and they also have access to the most up-to-date calculational methods”. He talked about how AECL carried out a whole series of tests and had been doing this for two years on the reactor itself, with CNSC monitoring every step, and then he talked about the fact that

> AECL's management, as far as I can see, were left with a technical problem for which a solution was not immediately apparent. They had put several hundred skilled engineers and scientists on the task, as well as many external reviewers, without finding the specific cause of the problem.

Actually, it was interesting to read that, because the last few days Mr. McGuinty in particular, but also Mr. Regan, said that no one outside AECL reviewed what was going on there. Clearly, many people were working on this. They weren't able to find the solution. Why would you say we would be able to be up and running now when that was, from my information, fairly common knowledge within the nuclear community?

● (1630)

The Chair: Mr. West, go ahead.

Mr. Steve West: I stand by my statement. We believed AECL was going to complete the reactor. They told us they were going to do it. We expected AECL to meet its contractual obligations.

We are also urging the government to reconsider the project, because we believe there are ways to complete these reactors—as I said, potentially looking at other options, maybe running the reactors at half power. For example, one MAPLE reactor can provide all the world's medical isotope needs.

Mr. David Anderson: We all know that, Mr. West.

Mr. Steve West: Therefore, what about having half a MAPLE reactor running at half power? Has that been examined? We would like a panel of experts to look at all of those options, to say “Maybe we should run these reactors at 50% capacity, and that will at least replace NRU until we find a technical solution”.

Mr. David Anderson: So you've had experts, you've had staff from inside and outside, you've had labs from outside the country, and you're still not willing to accept that hundreds of skilled engineers and scientists on the task and external reviewers haven't been able to do their job properly, that they've been incompetent while they've been doing it.

Actually, on that subject, I'd like to ask you a question. Why would the title of a *Canadian Medical Association Journal* article in March last year call the AECL "A black sheep in the nuclear family"? The article talked about your failure to work with the international community in setting up a backup plan to mitigate the effects of a disruption to the world's medical isotope supply. Basically, the gist of the article was that the European suppliers, the stakeholders, and some of the ones from South Africa were very concerned about the fact they couldn't get MDS Nordion to work with them to set up a global backup plan, because you wanted to put all of your eggs into NRU and MAPLEs, and they could not get you to work with them.

Do you have any reaction to that article, with which I'm sure you're familiar?

Mr. Steve West: Actually, we've always been in contact with all of the providers and have worked with them. We are actually part of that group that provides that information through the AIPES organization. So we do provide that information. We're not looking for confrontation; we're looking for collaboration. And in fact I believe the Society of Nuclear Medicine has actually said that the best option available is to complete the MAPLE project.

The Chair: Thank you very much, Mr. Anderson.

And thank you very much to all of you. Our time is up, unfortunately, but thank you for being here today and helping this committee with its study of this issue.

We will suspend the meeting for about two minutes to allow the witnesses to leave, and then we'll come back in camera and hopefully complete our review of the report on integrated energy systems.

[*Proceedings continue in camera*]

Published under the authority of the Speaker of the House of Commons

Publié en conformité de l'autorité du Président de la Chambre des communes

Also available on the Parliament of Canada Web Site at the following address:
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