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Chair

Mr. Leon Benoit

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● (1140)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): Good morning, everyone. We're here today to continue the study of the decision of Atomic Energy of Canada Limited and the government to discontinue the MAPLE reactors project, and its ramifications on the supply of isotopes.

We have as witnesses today, from MDS Nordion, Steve West, president; and Grant Malkoske, vice-president of strategic technologies. At the table we also have John Campion. He is legal counsel and will not answer questions. We have as an individual John Waddington, nuclear safety consultant.

I believe we have one presentation from each group. From MDS Nordion, Steve West is giving the presentation.

Go ahead please, sir, for up to ten minutes.

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

Good morning. My name is Steve West, and I am president of MDS Nordion. Accompanying me today is Grant Malkoske, the vice-president of strategic technologies; and John Campion, who is counsel—

[*Translation*]

Mrs. Claude DeBellefeuille (Beauharnois—Salaberry, BQ): Point of order, Mr. Chairman. Is there a copy for the interpreters? They do not have one.

[*English*]

The Chair: I believe they are having copies delivered to them right now.

Please go ahead, Mr. West.

Mr. Steve West: Thank you. I would like to reintroduce Mr. Malkoske, our vice-president of strategic technologies, together with John Campion, counsel to MDS. Both Mr. Malkoske and Mr. Campion have been working on this file for over a decade.

We have a statement to make to the committee today and are available to answer your questions. We would like to share some background relative to the supply of medical isotopes to the world and MDS Nordion's involvement in that. That history shapes our views today.

Secure long-term isotope supply assurance has been and continues to be a fundamental requirement for the nuclear medicine community. When MDS purchased Nordion from the Government of Canada in the 1991 privatization, long-term supply was a critical component.

Our 1996 agreement with AECL required them to complete two new dedicated reactors for our medical isotope supply—MAPLE 1 and MAPLE 2—and a new processing facility. MDS agreed to invest $145 million to build these new facilities, and AECL agreed to have them in service by November 2000.

MDS saw this as an important investment in providing for medical isotope supply security after the life of NRU. By February 2006, AECL had not completed the project. MDS had invested over $350 million in the project. The parties reached a mediated agreement. That agreement provided for an exclusive long-term supply of medical isotopes for 40 years and an interim supply until the completion of MAPLE. The agreement also established a series of in-service states for the MAPLE project from 2008 through 2010.

On May 16, 2008, AECL and the government announced their intention to discontinue the development of the MAPLE reactors at Chalk River. That announcement was a surprise to MDS. Prior to May 16, AECL did not notify or consult us on their decision or the announcement. As would be expected under our contract, we learned of it on May 16. As a customer of AECL, we were and remain very disappointed about the current intention not to complete MAPLE, despite significant investment and effort over the past 12 years.

We held regular meetings with AECL, and we had been consistently reassured that they were working on solutions to the MAPLE technical issues and would complete the project. Continuity of medical isotope supply for patients both here in Canada and worldwide is very important to all of us. Canada supplies more than 50% of the world's medical isotopes. The government has stated that there will be no disruption of supply and has asked AECL to pursue the extension of the NRU operation beyond its current licence in 2011. This is an important commitment to maintaining a steady and reliable supply of isotopes in the near to mid-term. We appreciate this commitment.

A decision to re-license NRU, however, does not address isotope supply after the life of NRU. MAPLE was intended to replace NRU and to establish long-term continuity of isotope supply. This was the basis for the substantial investments we have made in this public-private partnership: to build market-leading reactor capacity in Canada. We look forward to learning more about the plans for addressing long-term supply from the government and AECL.

● (1145)

There is one additional point I want to make. Last Thursday's testimony by AECL publicly highlighted a significant difference between our and AECL's view of the interim and long-term supply agreement. We have a very different view of that contract from AECL, as articulated both in its testimony and by its conduct. Among other things, we believe the contract obligates AECL to bring the MAPLE reactors into service and provide 40 years of reliable isotope supply.

We are currently evaluating our options and intend to pursue appropriate steps to protect the interests of patients, our customers, and shareholders. We respectfully request that the committee understand that these issues involve matters of commercial and legal confidentiality and will limit what we can speak about today.

Thank you, Mr. Chair.

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

If this issue were before the courts, of course, the committee would have to deal with this in one way. It isn't; therefore, we can continue in the normal fashion.

Mr. Waddington, go ahead, for up to 10 minutes, please.

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

Good morning, ladies and gentlemen.

I thought I should open by saying who I am, since I'm appearing as a private individual. I'm a professional engineer with about 40 years of experience in the nuclear safety business, nine years or so working on pressurized water reactors and the last 31 years working on CANDU and Canadian reactors with the Canadian Nuclear Safety Commission, with whom I was a director general for 11 years.

I did produce a short statement that I could read out to you on why MAPLE didn't work, or I could just answer questions, as you think fit.

Since retiring, one of the tasks I have been engaged in is to sit on an advisory panel, with a number of very distinguished retired professors, that advises AECL's board of directors on its research and development program. I should just make that clear.

I could outline in a brief manner why the MAPLE reactor didn't work, if that would be of use to the committee.

● (1150)

The Chair: I think that would be very helpful for the committee. If you would do that, it would be very much appreciated.

Mr. John Waddington: Very good, sir.

First of all, I think I have to outline what is meant by “didn't work”. To get a licence to build and operate a reactor, one must submit calculations to the regulator, the CNSC, that predict precisely how that reactor will behave. These calculations will show, amongst many other things, what is expected to happen when you want to increase the power of the reactor.

Now, forgive me if I stray into a bit of reactor physics, but I'll do my best to make it straightforward.

To start a reactor, control absorbers, made of a material that absorbs neutrons, are slowly pulled from the reactor in a series of small increments, at incremental distances. The density of neutrons in the core is measured all the time. Initially it's a very small number just due to the spontaneous fission of U-235, which is naturally in the reactor.

Each time the absorbers are pulled out a little further, the number of neutrons increases and then dies back again. Eventually, as you keep pulling the reactor control rods out, the number of neutrons in the core, instead of dying back, equalizes out and is at a steady number. At that point, when the number of neutrons is at a stable level, you have basically a self-sustaining critical reaction. The number of neutrons that are being born in the fission process is exactly being equalled by the number of neutrons that are being either captured by the absorbers, captured by other material in the reactor, or captured by another uranium atom and fissioning. The number of fissions in each generation remains the same. We have a stable population of neutrons.

The core, at this point, is still at a very low power. To increase the power, the control absorbers are pulled out again by small increments, and the number of fissions is increased. You've taken some neutron absorber material out of the core so the fissions increase, and the power of course increases. When the desired power is reached, the absorbers are pushed back in the core to bring the core back to a stable state again in which the number of fissions in each generation is exactly the same.

Now we come to the nub of AECL's problem. A desirable feature of any reactor is that as the power of the reactor goes up, the reactivity—just how reactive the core is—goes down. Let's illustrate this in practical terms. If you want to increase power, let's say, from two megawatts to five megawatts, you pull the absorbers out, let's say, ten millimetres. Those aren't the exact numbers, but we'll use those numbers for the sake of illustration. The power increases, and then as you approach the new power you push the absorbers back in again to stabilize the reaction, as we mentioned. You expect to see the absorbers go back in a lesser distance, say about five millimetres for illustrative purposes. What that says is that the volume of the core is slightly less reactive. You need a bit more volume to produce more power. But you are pushing the control rods back in at a slightly higher point than when you started. You pulled them out at 10 millimetres; you've pushed them back in five millimetres, and the reactor stabilizes or is expected to stabilize again at this new absorber height.

That is what is called a negative power coefficient of reactivity. That means you have a slightly less reactive core at the higher power. What that does is make the reactor easier to control.

AECL designed the MAPLE reactor to have a small negative power coefficient of reactivity, and all its design calculations showed that it did.

When a reactor is first commissioned, an operator has to demonstrate to the CNSC that the reactor will behave in reality exactly as it was predicted to behave in the analysis. When the commissioning tests of MAPLE 1 were first done in 2003, there was a surprise. Instead of the control absorbers stabilizing the reactor at a position slightly farther out of the core, as we just had a look at, once the power had gone up, they in fact stabilized the reactor slightly farther in. In other words, a slightly smaller volume of the core was producing slightly more power. That is termed a positive power coefficient to reactivity.

● (1155)

The difference was quite slight; it's just a few millimetres difference in rod height. The important point, though, was that as far as the CNSC and indeed AECL were concerned, the reactor was not behaving as it was predicted to behave. It was also slightly positive instead of slightly negative. But the important point here is that the behaviour didn't match the predictions.

In a nutshell, the reactor behaviour observed was slightly different from that predicted. And in the eyes of the CNSC and indeed in AECL's own eyes, not being able to predict the behaviour with a high degree of precision really is not acceptable. And as we noted, it is desirable to have a negative power coefficient, as any increase in power is slowed down by the negative feedback. A positive one can be acceptable, provided it is small.

Now, the change in core reactivity with power arises from many different factors, for example, the temperature and density of the moderator and the coolant, and from fundamental properties of the fuel itself. And that is a key result of the physics calculations that AECL was doing.

When the surprise arose, of course, the CNSC stopped the commissioning of the reactor until some explanation were forthcoming.

Now, what did AECL do about it? They did carry out a very detailed analysis of all the possible causes of this observed behaviour, using a panel of their most experienced staff and outside help, and they identified about 200 potential factors, of which about four or five were particularly likely.

They also asked the Idaho National Laboratory in the U.S. to do an independent prediction of the behaviour of the MAPLE core. The Idaho National Laboratory employs some of the very best reactor physicists in the world, and they also have access to the most up-to-date calculational methods. They came up with precisely the same predictions as AECL did; AECL's physics calculations, in essence, were consistent with the world's best physics calculations.

AECL carried out a whole series of tests, and has been doing so in the last two to three years, on the reactor itself, with the CNSC monitoring every step, to show what the contribution was from each of the factors they and other researchers thought were likely to be the source of the problem. The tests showed that some of those factors were indeed contributing to the positive power coefficient, but not enough to explain the whole effect they were seeing. The last set of tests in April of this year showed that the last factor being tested was not contributing at all to the anomaly that had been seen.

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. Again, it was not so much that the coefficient was positive rather than negative; it was that they could not satisfy the regulator, the CNSC, that they understood the root cause of the problem.

To solve the problem would likely need the development of new fuel that would be designed to have a definite negative power coefficient of reactivity. That's a task that takes several years and several million dollars.

How could AECL be faced with such an unknown today? The MAPLE reactor is unlike any other reactor. It's very small—about the size of a garbage can. It's quite small, and has a combination of highly enriched fuel in the "targets" that are to be harvested for their isotopes, and a combination of low-enriched and depleted uranium fuel to drive the core. It is a very non-homogenous core. This small size and the unusual reactor physics seem to have introduced a very sensitive interaction between the dimensions of the core, the fluid mechanics of the core, and the reactor physics that has not been observed before.

● (1200)

Thank you, Mr. Chairman. I'd be pleased to answer any questions the committee has.

The Chair: Thank you, Mr. Waddington.

Mr. Alghabra.

Mr. Omar Alghabra (Mississauga—Erindale, Lib.): Thank you, Mr. Chair.

Good afternoon, gentlemen, and thank you for coming.

Mr. West, can you explain to us the nature of the agreement with AECL for the supply of isotopes? Does AECL sell isotopes directly to other customers, or are you the only customer? How dependent is your business on it? Tell us about the nature of the arrangement you have with AECL.

Mr. Steve West: We have an exclusive arrangement with AECL: we buy isotopes exclusively from AECL as our primary source of supply, and they sell isotopes exclusively to MDS Nordion. That arrangement under our current agreement is from the NRU reactor. The contract also requires AECL to provide isotopes to us for 40 years from the MAPLE dedicated isotope facility .

Our current arrangement is an interim arrangement, designed to serve until the MAPLE reactors were brought online. This contract also allows us, during times of planned or even unplanned reactor outage, to secure isotopes from other partners that we have around the world.

Mr. Omar Alghabra: You are already an exclusive customer of isotopes.

Mr. Steve West: Yes, we are.

Mr. Omar Alghabra: I think anybody who has been observing the development with the MAPLE reactors could be aware of some of the problems that have arisen. When was the last time AECL told you that everything was still on schedule?

Mr. Steve West: Over the life of the project, we have had regular meetings with AECL in which they have informed us about the progress of the project. We mediated a new agreement with AECL in February 2006. As part of that mediation, AECL told us they would be able to bring the MAPLE facilities online by October 2008. In all of the meetings we have had with AECL, they have always assured us that they would be able to bring the reactors online according to the project plan.

Mr. Omar Alghabra: When was the last update?

Mr. Steve West: It would have been in April or March. These were regular meetings. There were monthly meetings and some quarterly meetings. We were concerned about the technical issues and uncertainties surrounding this project, but AECL never told us they couldn't complete the project. Throughout all those discussions, despite missing milestones, AECL stuck to the project plan.

Mr. Omar Alghabra: It's fair to say the same thing happened when the NRU reactor was forced to shut down without any notice and the isotope supply was interrupted in late December. When Mr. Malkoske was here, he told us that MDS was not notified at the time that there would be an extended shutdown.

Mr. Steve West: That is correct.

● (1205)

Mr. Omar Alghabra: The minister seems to believe that if AECL gets out of the supply of isotopes the private sector will step in. Could you tell us your point of view? What would happen if AECL got out of the isotope supply business?

Mr. Steve West: We are probably the major private enterprise player and isotope supplier around the world—the pre-eminent player. We have invested all this money in the MAPLE project. The government has not shared with us any of their perspectives or plans related to other private enterprise organizations. It's hard for me to comment on the government's plans.

Mr. Omar Alghabra: From your perspective, let's say AECL and the government get out of the supply of isotopes. What options would the private sector, including companies like yours, have?

Mr. Steve West: As it stands at the moment, the only viable option we see to provide a secure long-term supply of isotopes is completion of the MAPLE project. This latest news is very fresh and new, and we have not considered any alternative options. I'm not sure what other private enterprise companies might be doing.

Mr. Omar Alghabra: You are in the isotope business. Are there any other reactors available or potentially available to supply isotopes?

Mr. Steve West: There are none that I'm aware of, other than the existing facilities. All of these reactors are of a similar vintage. NRU is probably the older one, but all the other reactors also have a limited licence lifespan. I'm not aware of any other facilities today that would be able to meet the world's requirements for medical isotope supply.

Mr. Omar Alghabra: We're facing a tough situation right now. I'm talking not just from a business perspective but as a Canadian, because we saw last December what the outcome could be. In fact, we had the minister here, and he told us that Canadian lives would be at risk if we ended the supply of isotopes.

I'm very disturbed by that possibility, which appears to be more of a reality in the future than just a possibility. 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'm looking to you to give us some direction on what could be done.

Mr. Steve West: The MAPLE reactors were really the best solution. Honestly, they really were. This solution was designed way back in the 1990s around the awareness that NRU had a limited lifespan. We believe very clearly that the completion of the MAPLE reactors is still the most viable solution. This is the best solution for long-term isotope supply.

We are very concerned about the reliability of supply for patients in Canada and in the world at large, since NRU today supplies over 50% of the world's isotopes. The MAPLE was designed to be a facility that replaced NRU and had a redundant capacity as well, because it was two reactors. As far as we're aware, there are no other long-terms plans from the other major isotope producers.

That is the reality of the situation.

The Chair: Thank you, Mr. Alghabra.

We'll now go to Madame DeBellefeuille for up to seven minutes.

[*Translation*]

Mrs. Claude DeBellefeuille: Thank you very much, Mr. Chairman.

Good morning, gentlemen.

My question is for you, Mr. West. Reading through the timeline of the MAPLE reactor affair, at first glance, one could label the financial partnership with AECL as something of a fiasco. In fact, over the course of this affair, there have been several court cases, you have reopened and renegotiated agreements, and there has been litigation. From the outset, quite frankly, it made no sense.

Mr. Waddington told us in his testimony that in 2003, independent experts in nuclear technology wrote a fairly comprehensive report on the MAPLE reactor and came to the conclusion that they could not find a solution to resolve the reactors' problems. I think we have to give a lot of credence to the study. Despite that, you continued to have confidence in AECL, and you signed a new agreement in 2006 that included the parameters we saw earlier on.

Last February I attended a Canadian Nuclear Association forum, and already, the backroom chatter was that the MAPLE would never see the light of day. I am not an expert, but the fact that this reactor would never see the light of day seemed to be common knowledge. I am amazed that you are surprised since you signed an agreement in 2006 with the full knowledge that it was very unlikely that the MAPLE would see the light of day.

Can you tell me what motivated you, what your economic interest would be in signing such an agreement, an agreement that would almost certainly be challenged at some point in time?

● (1210)

[*English*]

Mr. Steve West: When we mediated our solution with AECL in 2006, they were very confident that they would resolve the issue of the positive power coefficient of reactivity. They gave us a timeframe of just two years from the mediation.

A lot of money, time, and effort had been put into the project. AECL were committing more resources and expertise to the project. They were very clear with us—and we felt confident in them as reactor experts—that they would complete the product. That is why we signed the mediation agreement. We believed that the reactors would come on line in October and through 2010. We believed that NRU had a finite life. We believed that this was absolutely the right solution for medical isotope supply for patients around the world, and we could continue to be the pre-eminent Canadian success story in this area.

[*Translation*]

Mrs. Claude DeBellefeuille: I am tempted to say to you that in my opinion, you were misled by the people at Atomic Energy Canada. It is not possible that they were unaware that there was little chance the reactor would be built and would produce isotopes.

The project was withdrawn, but taxpayers and the private sector, you in this case, have invested a great deal of money in this affair. That is to say that everyone is losing a lot of money. Following the presentation you have just made, I suppose you will ask the government for compensation for breach of your contract and for your financial losses. Québécois and Canadian taxpayers will therefore have to pay millions of dollars more in order to settle this case. The story is not over just because the MAPLE project has been withdrawn. I think we will have to plan for years of litigation unless you can come to an agreement.

The NRU reactor is 55 years old and its permit expires in 2011. You have signed a contract under which you will be supplied with isotopes for a 40-year period.

Do you think it is possible to upgrade the NRU reactor so that it can produce isotopes for 40 more years?

[*English*]

Mr. Steve West: NRU has a licence to 2011. It's a very reliable reactor. We're very pleased with the commitment AECL has made to upgrade the reactor. I heard Mr. MacDiarmid's testimony on Thursday, where he articulated the approach that AECL were taking toward that.

Beyond 2011—we generally all agree that a five-year licence is normally given to the operator—we've heard from AECL and the government that they will support whatever is required to meet the regulatory requirements to re-license NRU. We at Nordion will do our bit as well, if we can help in any way to assure that.

As far as the medium term is concerned, there is a path forward. We've heard that there's a high degree of commitment to bring the NRU reactor up to 2016. We have not been privy to any specific plans of either AECL or the government around the NRU reactor beyond 2016.

I still believe there's a long-term issue that hasn't been resolved, which was of course part of the MAPLE project, beyond 2016.

● (1215)

[*Translation*]

Mrs. Claude DeBellefeuille: Mr. West, you talked about being very concerned about the potential production of medical isotopes. The medical world is very concerned as well. The Minister of Natural Resources is the only person who is optimistic and who is speaking candidly about the future of medical isotope production. You're the first person who talked about a date beyond 2011. I have the impression that with the current situation, pressure could be brought to bear on the Canadian Nuclear Safety Commission to extend the permit, which could be dangerous in terms of safety. The situation is rather alarming. Building a reactor does not take two years. It takes several years and it is very expensive.

The minister told us that in the end, the withdrawal of the MAPLE project is not that traumatic because it will open the door to private sector businesses wanting to produce medical isotopes. You told my colleague Mr. Alghabra that you are not aware of any isotope producers in the private sector.

Could you repeat for me that to your knowledge, there are no new reactors or private sector businesses able to produce medical isotopes in Canada or elsewhere in the world at this time?

[*English*]

Mr. Steve West: On the scale that NRU and the MAPLE projects were envisaged in terms of medical isotope reactors, I'm not aware of any new initiatives.

If you look at this supply chain, all the major large-producing reactors in the world are actually owned by governments, and generally the supply chain is a combination of private-public partnerships, and governments and taxpayers have invested in infrastructure to build these reactors to supply large quantities. I am making a differentiation between large and much smaller quantities that perhaps would serve a very local requirement. Here we're talking about our particular situation, where we supply more than 50% of the isotopes around the world. Those reactors are owned by governments, not by private companies. Companies like Nordion have invested a lot of money in the supply chain, and we are the processors. That's the role we play: the reactors supply the isotopes, the processors are perhaps the customers of the reactors, then we purify and distribute the isotopes to our customers.

That is the framework. Just to reassert and answer your question, I am not aware of any private enterprise initiatives today on the scale we see in terms of a MAPLE or an NRU or any of the other larger reactors around the world.

The Chair: Thank you, Mr. West.

Merci, madame DeBellefeuille.

Now we go to the New Democrat member for up to seven minutes.

Ms. Bell.

Ms. Catherine Bell (Vancouver Island North, NDP): Thank you, Mr. Chair.

Thank you for attending today.

You are a private company and you have shareholders. Is that correct? You're accountable to shareholders?

Mr. Steve West: I think we're accountable to shareholders. I think we're accountable to our customers. And frankly, I think we are accountable to patients around the world too.

Ms. Catherine Bell: Okay. I am curious to know if this cancellation of the MAPLE project has affected your bottom line in any way.

● (1220)

Mr. Steve West: The day-to-day operations of isotope supply still continue from NRU. So there is no immediate impact on our company related to the supply of isotopes today. If the MAPLE project is not completed, that is a long-term issue for us and there will an impact on our company. In terms of how we respond to that, we haven't really had a chance to think about that; it is a longer-term issue. In the short term we still continue to receive isotopes from a very reliable NRU reactor.

Ms. Catherine Bell: And for a while, I hope.

Mr. Waddington, you said that when the April 2008 tests were done, the CNSC was not satisfied the tests would signify that the reactors would work properly.

Mr. John Waddington: To be precise, I said AECL wasn't satisfied. I suspect the CNSC wasn't satisfied either, but that's an assumption on my part. AECL themselves could clearly see from the tests that one of the factors they were assuming would be a cause of the problem has to do with the small amount of water around the outside of the core, between the fuel and the moderator. That was thought to have an effect on the way the reactivity was changing. A test was done with a slight design change that would have fixed the problem, and the problem stayed the same; it didn't have any effect. The point I was making was that AECL concluded that this particular factor was not causing the problem that they could see.

Ms. Catherine Bell: So in all these years of testing, it's never been resolved?

Mr. John Waddington: That's right. The tests that have been done have accounted for probably half the effect, but not the whole effect.

Ms. Catherine Bell: So there's no indication from all these tests that it will ever work?

Mr. John Waddington: The problem has been that until you find the causes of the positive coefficient of reactivity, you will have a problem convincing the CNSC to give you a licence.

Ms. Catherine Bell: I guess my question is, how long does taxpayers' and your shareholders' money keep being poured into a project that may never work? Is it feasible?

I suppose I'm asking Mr. West as well.

Mr. John Waddington: I don't speak for AECL, but just for myself. It would seem to me that this was exactly the problem AECL had: how much money do we keep pouring in when we're not sure at this point, having seen the latest set of results, that we know what all the causes are? I guess that is indeed the problem that was faced by AECL's board of directors.

Mr. Steve West: Large sums of money, both private and taxpayers' money, have gone into the project so far. We're not reactor experts, so it's very hard for me to make a commentary on what will work and what won't work. But in the absence of any other long-term supply plan, we still believe that AECL should meet its contractual commitments, that it should complete the reactors, and that we should have security of supply for 40 years.

Ms. Catherine Bell: I have one more question. I think AECL said at the last meeting that the 40-year contract was contingent on the MAPLE being online, and that if that's not going to happen, then the contract was null. That's my understanding of it. Is it your understanding?

Obviously it's not.

Mr. Steve West: Clearly we have a dispute and a very significant difference of opinion with AECL around that contract. We clearly believe they have an obligation to supply isotopes for a 40-year period on commissioning of MAPLE.

We are examining all our options. It's hard for me to comment beyond that, frankly.

Ms. Catherine Bell: You mentioned some different kinds of rods. Was there investment into changing more things such that MAPLE could actually work?

● (1225)

Mr. John Waddington: One of the alternatives that are open to AECL is to redesign the fuel itself, as opposed to the targets, although the targets in fact contribute quite a bit to the power. When you design fuel, you can design it with certain power characteristics right up front, depending on how you make the fuel and what you put in it.

So AECL does have an option to redesign the fuel with a different set of characteristics that would enable it to have a very definite negative power coefficient of reactivity. But when you make new fuel, you have to go through a detailed qualification process before you can convince the CNSC, the regulator, that you can put it into a reactor and fire it up. That takes quite a few years. You have to actually put it into a research reactor and check again that each fuel design you've made will in fact behave exactly as you expected, and you do that in a research reactor before you do it in the production reactor. That's quite a long job and quite an expensive job.

Ms. Catherine Bell: But did you see that as one—I guess the last—option to get the MAPLE online?

Mr. John Waddington: Is it the last option? Yes, I would say it's probably the last option they have. The problem really is that even with new fuel there's still some combination of factors going on in that reactor that is not fully understood—which is a problem.

Ms. Catherine Bell: So there's no guarantee?

Mr. John Waddington: Even that, I would say, is not a complete guarantee. Obviously if you ensure with design of the fuel that you are well negative on your power coefficient, then you can stand quite a degree of uncertainty, because you're well negative—more than you can stand when you're just around the negative-positive boundary.

The Chair: Thank you, Ms. Bell.

We go now to the government side for up to seven minutes.

Mr. Trost.

Mr. Bradley Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair.

Sitting through these two committee hearings on this issue, I have to say I feel a little like a motorist driving by an accident. It's a horrible thing that has happened, the MAPLEs not being able to work, but I feel somewhat fascinated by the wreck that's happening there.

When you look at the timelines when this was started—I'm looking at some of my briefing notes—as part of the agreement, the government provided a $100 million interest-free loan to get this going, and the dedicated isotope facility was expected to produce radioisotopes by the end of the year 2000. So an agreement was reached in 1996, and things were supposed to be rolling by 2000. The last I checked, we're right now in 2008. I think it's pretty obvious just how badly this has gone wrong—not just to people who followed it, but to the general public.

My question is to Mr. Waddington and also MDS.

When did you realize this technology was high risk? Initially, when you look at the timelines, I think the assumptions would have been, coming from a more general public perspective, that this technology would be relatively low risk. They had some definitive timelines. But in your minds, when did it begin to become clear to you that this technology, as far as being able to deliver the product desired goes, was high risk? When did you start to come to those conclusions?

Mr. John Waddington: Speaking for myself, sir, and the advisory panel of professors with whom I sit, who advise the board of directors of AECL, I think we came to the conclusion that there were some serious difficulties here probably around about 2006, when we did a detailed review of what had happened up till then and a detailed technical review of all that had gone on to that point.

We advised AECL's board of directors at that time that the things they were doing and the process they were following were, in our view, the right things to do, given the circumstances. They were doing a very detailed analysis, seeking expert help from outside, setting up a series of tests, which had started by then, to get to the bottom of it. So they were certainly following the right path, but we also looked at the chances of in fact coming up with a result that wasn't satisfactory. That was clearly a possibility in 2006, in our view, in terms of the advisory panel.

● (1230)

Mr. Steve West: From the outset, I don't think we ever saw this project as a high-risk project. We would never have invested the amount of time and money in the project if we didn't think it was going go be completed. When we mediated the new agreement with AECL in 2006, I have to say they felt very confident that, despite the issues they had, they were very capable of resolving these issues.

So in terms of quantifying the risk of the project, our position was that we thought we had invested enough of our shareholders' money in the project. We also believed that AECL should take ownership and finish the project. They assured us they could do that. Otherwise, I think, we would have gone down a different path. But AECL was very clear with us—and that's just two years ago—that they would complete the project, and they would complete it on time.

Mr. Bradley Trost: The issue I'm having a bit of a problem grasping is that, according to my notes, we were looking at 2000. I can see 2001 or 2002. This was six years later. Was it just that everyone kept thinking, "Well, one more minor tweak, one more minor tweak"? You can say that for one or two or three years, but not six. That's more than the length of time, really, of the original estimate; we had already gone double the length of time. To a layman, that's beginning to raise a few red flags.

Mr. Steve West: Maybe one of the issues in this saga is—

Mr. Bradley Trost: I mean, my colleague has just pointed out to me that by 2006, according to our notes, your company had put in $350 million.

Mr. Steve West: It had; that is correct.

Mr. Bradley Trost: You accountants would have been very stressed at that point.

Mr. Steve West: Our shareholders even more, perhaps.

But of course the issues around the technical problems varied, as we understood it from AECL. So all the delays up to 2003 were completely different issues.

Mr. Bradley Trost: So you had a different excuse every time.

Mr. Steve West: The issue around the coefficient of reactivity really started to occur in 2003.

I might ask Mr. Malkoske, who has some long history in this, to comment, but I think that at the beginning of the positive coefficient of reactivity issue, it was actually seen to be a relatively solvable issue.

Mr. Malkoske, you may have another view, and Mr. Waddington.

Mr. John Waddington: Perhaps, Mr. Chairman, I could just—

Mr. Bradley Trost: Could you be brief, as I do have a couple of other questions.

Mr. John Waddington: In 2006 we considered the risk of not completing the job and not finding the problem. I don't think at that point we would have said it was a high risk, but it was definitely a risk.

Thank you.

Mr. Grant Malkoske (Vice-President, Strategic Technologies, MDS Nordion): I will pick up on Mr. West's comment.

I think that as we look at the MAPLE project now, there were a number of different factors that played into this, and it really wasn't until 2003 that the power coefficient issue emerged as another technical issue that needed resolution. It had been characterized very early on as something that would be resolvable, frankly, in a matter of weeks.

So when you take a look at the question of whether or not this was a high risk, it was obviously not deemed to be a high risk. As this was going on, there were other issues still emerging on the project. So we shouldn't characterize the MAPLE reactors as having only a power coefficient issue that needed to be resolved. We had the best reactor experts in the world designing and building these facilities, which were going to be dedicated solely for isotope production.

● (1235)

Mr. Bradley Trost: Before my time ends, I have a very quick question.

Regarding the theoretical predictions for the power coefficient of reactivity, if the physicists had somehow figured out in the equations that it would have been a positive power coefficient instead of a negative one, would we be able to operate the reactor today, or would there be too many unknowns at this point that we would still say no because of the positive coefficient?

To summarize, what I'm asking is this. If the predictions had said there would be positive instead of negative coefficient, would we be running the MAPLEs today?

Mr. John Waddington: I can't speak for the CNSC, as they would make that decision. From a reactor safety point of view, you can operate a reactor with a small positive power coefficient. It's not the desirable method, but it can be done, and you can do it safely. What you have to do is slow down the way in which you move the rods so that you bring more control, or a very high level of control, into the system.

So it is possible to operate the reactor with a small positive coefficient as long as you can predict exactly, as you said, in your calculations that this is how it will work, so that you will know exactly what's going on.

Mr. Bradley Trost: So there are essentially two ways of solving this problem: one, get the predictions to fit the reality, or two, change it from a positive to a negative coefficient.

Mr. John Waddington: That's correct.

The Chair: Time for a very short question, Mr. Trost.

Mr. Bradley Trost: As a quick follow-up, how long in the future could the NRU run safely, in your opinion, Mr. Waddington? Could it continually be upgraded and redesigned? Is it like a Model T Ford, where we could just keep dropping in a new engine or motor and have it work indefinitely?

Mr. John Waddington: Yes, you can run it for quite some mileage. You know, the safety systems were upgraded in 2005 to meet modern standards.

My understanding is that this morning CNSC and AECL were discussing what might be done to extend the life of the NRU reactor. My understanding is that the CNSC would follow the same route it follows in extending the lives of power reactors.

As you're probably aware, reactors around the world are having their lives extended from the current phase of 40 years up to 60 years. There is a formal process, which is followed around the world by many regulators, for doing that.

In essence, you step back and do what is called an integrated safety review. The CNSC has documents out that tell licensees how this needs to be done. The licensee has to basically do a detailed assessment of the status of that reactor, how it meets modern standards, and what would be needed to extend its life for, in the case of power reactors, 20 years. I would imagine that the same process can be followed for the NRU.

The Chair: Thank you, Mr. Trost.

We go now to the official opposition.

Mr. Boshcoff, you have up to five minutes.

Mr. Ken Boshcoff (Thunder Bay—Rainy River, Lib.): Thank you, Mr. Chair. I will be sharing my time with the member for Brant.

The type of question I'm going to be asked will be about redundancy or even continuance of supply. I wonder if new and improved technologies that were being developed as a cross between Chalk River or MAPLE, utilizing that barrel-sized reactor, could be developed. And how long would it take for financing approval, design, and construction?

Are there any obvious sites in the country besides Chalk River that have all the factors, such as water, power supply, existing medical and research capabilities, and transportation linkages? Would MDS itself be interested, seeing as it's already in the business and has innumerable connections, esoteric experience, and market development? Would you yourselves be interested in partnering, or would you just want to have a monopoly in production if such was the case?

You've already invested $350 million. Do you have any proprietary rights to any of that knowledge? And could it be applied to another option, say, in the future?

I have just one quick question after that. Has disposal of spent material at Chalk River or MAPLE been a serious factor in any decision to conclude this?

Mr. Steve West: Part of your question is about the technicalities of operating reactors, and I would probably say that we are not the experts, so I'm not sure I can fully answer all of that.

In terms of what it takes to produce medical isotopes and our role in that, there's a lot of infrastructure required, clearly. We would be very open to looking at all options to ensure continuity of supply—let me state that—although we do have a contract with AECL, which we alluded to.

There are many requirements in terms of production, processing, safety, regulation, and logistics. This business has always had, I think, barriers to entry, and we don't have exclusivity in the market. What we do have, though, is a lot of know-how that we've built up over the years. I think it's very difficult to duplicate, frankly, and probably that's one of the reasons we are a great Canadian success story. We do have a lot of embedded knowledge. I assume that AECL also has a lot of embedded knowledge that it might be able to share.

When it comes to long-term supply and when it comes to the needs of patients and supplying our customers, I think we have to look at those options, and we're prepared to do so. It's not intuitive to me today what those options are. And it's not obvious to us that there are any other options today other than completing the MAPLE reactor. I want to be very clear about that.

● (1240)

Mr. Ken Boshcoff: Would you visualize a series of smaller sites around the country, or some that could produce the redundancy or actually produce more that could actually help the world address the problems that isotopes are capable of solving?

Mr. Steve West: We have not considered that. This is fresh new news for us. My instincts tell me that the answer to that question, though, is probably not. That doesn't sound like a very feasible way to go about doing this business.

The Chair: Thank you.

Mr. St. Amand, you have 30 seconds, so 15 seconds for the question.

Mr. Lloyd St. Amand (Brant, Lib.): Gentlemen, you're pretty moderate fellows. I was very surprised when I heard that AECL was not continuing with the MAPLE project. I don't have a dollar invested. I can only imagine your shock at being told on May 16 that MAPLE was history.

By that point, you had been involved in a series of meetings with AECL. There was nothing in any of those meetings that caused you to believe that the project, even though it had troubles, was going to be totally scuttled. It almost seems to me as though on May 16 the decision to get out of the MAPLE reactor business was imposed upon AECL and that the decision was then conveyed to you.

Is that a fair read or not?

Mr. Steve West: That is close. I received a phone call at around 7:45, and the announcement was made at 8:30. It was a total surprise. We had never had any discussions around the notion that this project would not be completed.

Mr. Leon Benoit: Thank you, Mr. St. Amand.

We go now to Madame DeBellefeuille from the Bloc.

[*Translation*]

Mrs. Claude DeBellefeuille: Thank you very much, Mr. Chairman.

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.

[*English*]

Mr. Steve West: From our perspective, we were relying on the MAPLE reactors. Our business was relying on MAPLE reactors coming on stream. We don't have any other options, and we don't think patients or our customers have any other options. We're talking about over 50% of the world's medical isotopes, and that requires a large facility.

[*Translation*]

Mrs. Claude DeBellefeuille: 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. Some of the people you were dealing with were perhaps less than honest, but the fact remains that it was a bad deal from the outset.

Mr. Waddington, you are an expert in these matters. You have studied the experience and the review of the independent experts. There was already agreement in 2003 on the explanation that you gave us, which was that it was doomed to failure.

If you had been in the same position as MDS Nordion, would you have signed a contract to continue on with the project in 2006? If I had been in their shoes, I would not have trusted Atomic Energy Canada, under the circumstances. The realizations of 2003 were very serious.

I cannot understand how it came to this. Quite frankly, as a member of Parliament, as a taxpayer and as a citizen, I cannot understand how a company, a government and experts managed to find themselves in this dead-end today, where everyone seems surprised. I cannot conceive of such a thing.

Would you have signed a contract and invested some $300 million more to continue on with the MAPLE reactor study, in the full knowledge that there was little chance of finding a solution?

[*English*]

Mr. Steve West: First of all, I would just make a correction, if I may, madame. The problem first appeared in 2003 as a result of the commissioning tests. At that point AECL—and indeed, if I had been looking at it in 2003—came to the conclusion that we would go through a process and we would solve this issue. So in 2003 there was absolutely no doubt in AECL's mind, and I think in most observers' minds, that we had a technical problem—a surprise—that, with due diligence and care, we would be able to solve.

I don't think the doubts about the solution really came to the fore until 2006 or 2007, when the test results became more understood. We were getting an understanding of only about half the problem. The full realization that we really were in a difficult spot because we had only been able to identify half the cause came in April of this year.

In answer to your question about what if I had invested $350 million, as a private citizen I don't have that, but as a taxpayer in 2003, I would have thought it was a good investment. Canada has the work on it, has the business.

In 2006 we were looking at the situation. We could see that things weren't going quite as well as they should have been by then, and we thought we should start looking a little further down the road. I guess the full realization came in 2008.

● (1250)

The Chair: Thank you, Ms. DeBellefeuille.

We will go now to the government side for up to five minutes.

Ms. Gallant.

Mrs. Cheryl Gallant (Renfrew—Nipissing—Pembroke, CPC): Thank you, Mr. Chairman.

Thank you to the witnesses for appearing here today.

After listening to some of the questions, I hope that one day you will invite members of this committee to tour MDS Nordion, and perhaps even the Chalk River site, for AECL. That would give people a much better idea. I don't think anybody here has ever seen a nuclear reactor.

You have, Mr. Alghabra.

In any case, we could see the whole line from radioisotope production right down to what you do.

In the 2000 election, Chalk River was promised a replacement for the NRU, the Canadian neutron facility. Several of the questions here today referred to a backup source of radioisotopes. How would the construction of that facility—which would have been online right about now, as it would have taken about six or seven years to build—have affected the supply of radioisotopes for your company?

Mr. Steve West: I guess that would have been another supply source for us, so it would have been a good thing.

We've heard discussions on and off about the CNF, but we've never really been involved as a company in those discussions. It has always been around the notion that this would be a neutron facility for research, and the MAPLE reactors were a facility purely for medical isotopes. There was quite a distinction between them. I don't think we've ever had any discussions about a replacement for NRU for medical isotope production, other than MAPLE.

Mrs. Cheryl Gallant: We've learned our lesson now that we don't have a single-use reactor built for research purposes.

Mr. West referred to other problems that the MAPLE project encountered prior to 2003. Can you elaborate briefly on what some of those problems were?

Mr. Steve West: The project ran into some problems, prior to commissioning in 2000, around the shut-off mechanisms for the control rods. They were safety issues, essentially. This was before the coefficient of reactivity issue.

I'm going to ask Mr. Malkoske to comment, because he was there at the time and I wasn't.

Mr. Grant Malkoske: Prior to 2003 there were issues related to the shut-off rods, the control absorbers. There was a study done by the Canadian Nuclear Safety Commission. One was also done by Atomic Energy of Canada Limited. It took a look at quality assurance issues through the construction of the MAPLE facility. These were some construction issues that were being dealt with at that time.

Mrs. Cheryl Gallant: Thank you.

Was AECL able to verify the content of the fuel for the MAPLE reactors? I understand it was a different source than for the NRU. Were they able to verify that what they thought they were getting was indeed what they were receiving?

Mr. John Waddington: I'm not quite sure I follow the question. Do you mean in terms of the degree of enrichment in the uranium?

● (1255)

Mrs. Cheryl Gallant: That's correct.

Mr. John Waddington: The fuel that would be made would be subject to very stringent checks and balances in making sure that the right amount of uranium was in the fuel and that the fuel met the design specifications. There's a very rigorous process, particularly with enriched fuel, and of course the target is a highly enriched fuel. There are very rigorous processes that control the degree of uranium in each of the fuel bundles.

Mrs. Cheryl Gallant: Was AECL able to verify that?

Mr. John Waddington: Yes, they would have done that.

Mrs. Cheryl Gallant: Are there other entities or reactors or potential customers for this very same enriched fuel?

Mr. John Waddington: If we take the highly enriched material, there are a number or research reactors around the world that still use enriched uranium in their fuel. There is, however, a general push around the world to reduce the use of highly enriched uranium and move to low-enriched uranium. That is really for nuclear proliferation purposes. There is a strong push around the world to do that. With MAPLE 2, there has been a push to look at what can be done in the future to change the fuel from highly enriched uranium to low-enriched uranium, but that was a question for the future.

Mrs. Cheryl Gallant: That was evolution down the way.

Are you aware of any interest from other private companies to develop a nuclear reactor for medical isotope production, either in Canada or internationally?

Mr. Steve West: In terms of a commercially viable operation, no, I'm not. Actually, people came to us some years ago and said they thought they had a design that might work, but it was purely a paper design. At the time we were looking at MAPLE coming on stream, so I don't think we were in the position of investing in a second technology—

Mrs. Cheryl Gallant: Are you aware of other national governments that are interested in developing a nuclear reactor for medical isotope production?

Mr. Steve West: We have heard of discussion in the United States, because there is concern, obviously, in the medical community about the long-term supply of isotopes. We're aware that there has been discussion by the Department of Energy, a U.S. government institution, about possibly expanding a reactor in the United States. There has been discussion.

Mrs. Cheryl Gallant: Is that the same source of your enriched fuel?

Mr. Steve West: No, it is not.

The Chair: Thank you, Ms. Gallant.

We will have two minutes from each party wishing to question again, starting with Mr. Tonks from the official opposition.

Mr. Alan Tonks (York South—Weston, Lib.): Thank you very much, Mr. Chairman.

Thank you very much for being here. I found it really very enlightening. I didn't know anything about it and still don't know that much, but thank you very much for giving the overview. People, especially patients and consumers out there, are very concerned about what the future holds.

I have a question that was prepared by our researcher, so I will go to you, Mr. Waddington.

The South Koreans have their HANARO 30-megawatt nuclear reactor, and it's MAPLE-based technology, apparently. Is that the kind of system that could be converted to produce isotopes? That is a searching question, inasmuch as Mr. West has indicated that internationally there is a real shortage.

Could you address that issue, please?

Mr. John Waddington: Theoretically I would say yes for somebody who uses the same fuel. The main driver fuel in the HANARO reactor is similar to that in MAPLE. It would not be a small matter: you'd have to do a complete new physics analysis, because you replace some of the normal fuel with this very specialized target fuel from which you harvest radioisotopes. That's a very specialized fuel and gives you very strange flux shapes; that is, if you look at the neutron density across the core, in a power reactor you'd generally like a nice smooth shape and for it to be very nice and predictable. When you put a small amount of highly enriched uranium in a small spot to give you your source of isotopes, you get very big peaks in flux shapes, so you'd have to go through that physics analysis and so on.

But theoretically, I would imagine it is possible.

Mr. Alan Tonks: Thank you.

The Chair: Thank you, Mr. Tonks.

Now to Mr. Allen from the government side.

● (1300)

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

Mr. Waddington, you said you could not predict if you were running at a positive coefficient, and you said you could if it was small. Using your 10 millimetre analogy, what is small?

My second question is, if it continues to operate, what is the result?

Mr. John Waddington: First of all, let's clarify what is small. When I was talking about 10 millimetres, I was using an example of what the rods do to illustrate how the process works.

Reactivity itself is measured in milli-k. I won't bore you with the physics, if I may, but basically the reactor currently is operating with a positive power coefficient of around plus 3 milli-k, when it was designed for minus 1 milli-k.

Again, this would be a decision for the CNSC to make, not me, but if you understood exactly what was causing it and you were running with a positive power coefficient around 1 milli-k, or somewhere around that, I would have thought you could make a safety case to the CNSC.

The effect of a small positive reactivity like that would mean that you would change the speed at which you could move the control rods up and down. You'd slow them down a bit to compensate for the fact that you have a slight positive reactivity in there, and as long as you were quite small with that positive, the slowing down of the control rods would still leave you with a viable production unit.

Basically, the MAPLE reactor has to be shut down at regular points to remove the isotope material for Nordion and then it's restarted. If you do that too slowly, you get buildup of xenon in the reactor, which then poisons the reactor out, and you can't start it for a long time, some 36 hours or so. So there is a window of opportunity there where you shut the reactor down, remove your radioisotopes for harvesting, and restart it. That's a function of the speed with which you can move control rods and things like that, so there is a limit to how positive you can go for that purpose.

Mr. Mike Allen: On a point of clarification, Mr. Chair, about the second question, if he has to answer it in writing, that's fine.

Mr. John Waddington: Yes, I can certainly do that.

Mr. Mike Allen: The second question was what happens if you do run it at that positive coefficient. Was your answer that you manage the rods?

Mr. John Waddington: Yes, it was. That was the answer to the second question. You can run it safely, but you would have to run it a little slower.

The Chair: Thank you very much.

Thank you to all of you for coming today. The information you have given has been very helpful. Mr. Waddington, in particular, managed to take a very complex subject and simplify it for the committee. That is much appreciated.

We will continue with this study on Thursday. Until then, the meeting is adjourned.

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