LEGISLATIVE ASSEMBLY OF THE NORTHWEST TERRITORIES

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Speaker: The Honourable Donald M. Stewart, M.L.A.

LEGISLATIVE ASSEMBLY OF THE NORTHWEST TERRITORIES

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HAY RIVER, NORTHWEST TERRITORIES

FRIDAY, MAY 22, 1981

MEMBERS PRESENT

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ITEM NO. 1: PRAYER

---Prayer

SPEAKER (Hon. Don Stewart): I am proposing to the House, and asking for unanimous consent, to waive Items 1 to 12 on the order paper, and go immediately to Item 13, consideration in committee of the whole of bills, recommendations to the Legislature and other matters. Any opposition?

SOME HON. MEMBERS: Agreed.

---Agreed

ITEM NO. 13: CONSIDERATION IN COMMITTEE OF THE WHOLE OF BILLS, RECOMMENDATIONS TO THE LEGISLATURE AND OTHER MATTERS

MR. SPEAKER: We will resolve into committee of the whole, then for consideration in the committee of recommendations to the Legislature and other matters, uranium exploration and mining and Sessional Paper 1-81(2), with Mr. Pudluk in the chair.

---Legislative Assembly resolved into committee of the whole for consideration of Uranium Mining and Exploration, with Mr. Pudluk in the chair.

PROCEEDINGS IN COMMITTEE OF THE WHOLE TO CONSIDER URANIUM MINING AND EXPLORATION

CHAIRMAN (Mr. Pudluk): Now this committee will come to order. The uranium debate will continue this morning. Mr. John Moelaert for the Dene Nation, will appear before this House. Is this House agreed?

SOME HON. MEMBERS: Agreed.

---Agreed

CHAIRMAN (Mr. Pudluk): Sergeant-at-Arms, will you escort Mr. John Moelaert to this House? Mr. Moelaert, I would like to welcome you to this House. For your opening remarks the maximum is one hour. If you want to stop early, we will not mind. We will have another one hour for a question period. You can proceed now, Mr. Moelaert.

Presentation By Mr. John Moelaert

MR. MOELAERT: Thank you, Mr. Chairman. Members of the Assembly, ladies and gentlemen, boys and girls, I appreciate the invitation to address you on this very important issue of the possibility of the resumption of uranium mining in the Northwest Territories.

My name is John Moelaert. I am a communication consultant, and president of Insight Communications Inc., resident with my family in Kelowna, British Columbia. I was first involved in nuclear issues in 1960, when people were told that nuclear fall-out was harmless. I think it is worth mentioning this, because all of us appear to be blessed with 20/20 hindsight, because now, of course, we know that nuclear fall-out, and now we have the medical information and the resultant class-action suits from those people who in the meantime have contracted cancer of the thyroid, leukemia, and so on, those people who were the direct victims of the fall-out, particularly in the states of Nevada and Utah. We can only hope that, at the conclusion of these hearings, you will collectively show 20/20 foresight.

I have written, and spoken, on nuclear issues many times, and my articles have been published as far away as Japan. I am the past chairman of the Kelowna branch of the Canadian Coalition for Nuclear Responsibility, and was the uranium information co-ordinator for the United Church during 1979, when the British Columbia royal commission on uranium mining took place. I was also a participant in that royal commission, and the author of "Uranium Mining is Not in the Public Interest", which is the official submission to the commission by the Kelowna branch of the CCNR, a copy of which I have here, and which is still available by ordering it from the CCNR at Box 1093, Kelowna, British Columbia, at a cost of five dollars. The reason I mention this is because the report, which contains 69 pages, is not only an eye opener on the health and environmental aspects of uranium exploration and mining, but it would also give the Members, I respectfully submit, an eye opener on the royal commission process.

Ultimate Decision On Uranium Mining Not Purely Scientific

Like Terry Anderson of the United Church, who, I understand, gave evidence before you on Tuesday, I am here at the invitation of the Dene Nation. I should point out, as Terry has, that I do not represent the Dene Nation, but consider it a privilege to speak on their behalf. I regret that, because of the necessary rescheduling in the appearance of witnesses, that I cannot speak in concert with Terry Anderson, for I have a very high regard for his views on, and recognition of, the ethics involved in uranium mining, and I suppose that gradually you will realize that essentially the ultimate decision on uranium mining is not purely scientific, but rather one of values, weighing the values of public health and well-being against those of corporate well-being.

Like George Bernard Shaw, I believe life can be justified only if it is an ongoing learning experience, and I share his sentiments when he said the only time his education was ever seriously interrupted was when he went to school. In fact, the degree most worth having, in fully understanding all the ramifications of the nuclear issues is not a degree in nuclear physics or a degree in geology, but rather a degree of common sense.

I believe it is significant to be in the Northwest Territories discussing uranium because, of course, Canada's entry into uranium mining started in the Northwest Territories near the community that is now known as Port Radium, and I assume -- someone may have mentioned it before but it is worth repeating -- that the uranium extracted at the request of the United States government between 1942 and 1944 was, in fact, used to produce the atomic bomb which was dropped on Hiroshima in 1945 with a loss of lives that is variously estimated to range between 100,000 and 200,000 people.

I am glad to share with you the lessons learned when the people in British Columbia considered, and rejected, uranium mining in that province. In British Columbia, four major concerns surfaced, and I would like to briefly mention them, and come back to them later on during my presentation. The four are: (1) health and environmental effects; (2) the inadequacy of government regulations; (3) the difficulty in obtaining information from government and industry; and (4) the dangers in the uses of uranium.

I would like to get into my presentation at this point, by showing you a few slides, because, as the saying goes, a picture is worth 1000 words, so we can save some time. I only have a few slides, but I think this visual presentation will help the Members to more clearly understand what this is all about. Mr. Chairman, if I may proceed, I have the slides here, and I understand there is a projector available and a screen there which I hope everyone can see.

CHAIRMAN (Mr. Pudluk): I would like to get permission from this House if he can present the slides.

SOME HON. MEMBERS: Agreed.

---Agreed

CHAIRMAN (Mr. Pudluk): Please present the slides, Mr. Moelaert. Can everybody see it? Okay, Mr. Moelaert.

MR. MOELAERT: Can I sit down, please?

CHAIRMAN (Mr. Pudluk): Sure, go ahead.

Slide Presentation

MR. MOELAERT: The first slide, even though it dates back to 1976, still gives a fairly accurate impression as to where uranium in Canada is found, and as Mr. Chambers mentioned yesterday, it is found pretty well anywhere in Canada, the main difference being the concentrations in which it appears. Of particular interest to you should be the area in northern Saskatchewan. This, of course, is the area where most of the uranium exploration and mining is going on, and it is believed that this belt extends into the Northwest Territories.

When we talk about exploration for uranium, it is important to distinguish between flying over an area and testing it for radio-active presence, or so-called "disruptive" exploration, which involves drilling, such as is the case right here. This particular site is the Blizzard property, the largest uranium deposit found in British Columbia. Of great interest is the very serious problem of tailings being situated in areas such as these, and I believe they are not that different from the Northwest Territories, because water and air will bring the radio-active contaminants beyond the tailings disposal site. Tests have been conducted by injecting dyes in these drill holes, only to find the dye showing up shortly afterward in ponds beyond the site.

Here is an example of radio-active uranium cores being stored in an obviously flimsy type of construction. We were told that this was safe, but we questioned this, and we noticed also with interest that none of the employees, although they were required to do so, were wearing the dosimeter badges to measure the radio-activity to which they were exposed. When the royal commission arrived on that very same property, the Blizzard claim, some major changes had taken place, because the core samples were then stored in this building that you can see here. Staff members did, in fact, wear the dosimeter badges, and a sign was put up to show that some radiation was, in fact, present there.

The Dene Nation are particularly concerned, because they know that in many parts of the world where uranium has been found, and where it is being mined, is in fact on native land, notably in Australia, in Namibia, and here in New Mexico, where the Navajo Indians have suffered greatly as a result of uranium mining. This is the so-called sacred mountain in the foreground. You can see the scarred area which is the direct result of uranium mining, an open pit uranium mine, and a Navajo Indian woman standing there.

Serious Problem Of Tailings And Radio-Active Dust

The tailings, which you can see here, have caused very serious problems. The tailings dams that were built were supposed to be of the latest design, and in July of 1979 more than 100 million gallons of these semi-liquid uranium tailings went into the Puerco River and contaminated it up to a distance of 75 miles from where the rupture took place. Signs were subsequently posted advising people not to drink the water, but, as has been the case near Elliot Lake, whenever drinking water supplies are contaminated and people are warned against it, or they are warned not to eat the fish in the area, rarely do government officials tell them what to drink and what to eat instead. It may be of interest to you to know that in this particular case as far as 15 miles away from the rupture wells, drinking wells, up to a depth of 30 feet were found to be radio-actively contaminated.

Another problem, a serious one, is radio-active dust being swept into and beyond the mine site of which this is an example. The mines that are underground are being vented, as you can see in this particular slide, and along with the dust, radon is being dispersed this way into the area. I will leave it to your imagination to figure out the dangers inherent in that practice.

This is the healthy lung on the left and a diseased one, lung cancer, on the right, and, of course, as we all know from the testimony that you have heard already, that is a major, though not the only concern of uranium mining.

Closer to home, at Elliot Lake, here is an aerial photograph of that operation, and again, I wish to draw your attention to the presence of river and lake systems all over the area. Here is a tailings disposal site, and a tailings dam, and what happens when these tailings dams either rupture or let some of these tailings escape by seepage into the environment. It must be understood that it is difficult and often impossible, depending on the scope of the contamination, to retrieve this radio-active material.

Madame Marie Curie did the original research on radium and died as a direct result of her research at the age of 67. Her daughter, Irene, carried on with her research, died also of leukemia at the age of 59. Her husband did not die of leukemia even though he was involved in research. He was hit and died as a result of a collision with a truck. He died in his 40's.

Much closer to home again, this is northern Saskatchewan, the Key Lake area, and one of the things that other witnesses may not have touched upon so far is that as part of the uranium mining operation, lakes are being drained with these results. Obviously that does not do much for the fishing industry.

Here is another example. You can see the water going down and the land going up. Whether it is uranium tailings or a nuclear power plant, the problems are similar in so far as the dispersal of radio-active contaminants are concerned. They may either move through the air or through the water, and as they do so, they concentrate in the food chain. For example, in algae, the radium levels may be between 500 and 1000 times higher than in the surrounding water. When fish will eat the algae, the concentration will be higher again. By the time people will eat the fish, the level would be higher again with all the obvious dangers. As a reminder of the extreme lethal nature of radium, a study that was prepared for the United States National Academy of Sciences shows that as little as one millionth of a gram of radium is sufficient to induce bone cancer in human beings.

Use Of Uranium For Nuclear Power And Nuclear Arms

There are only two primary uses for uranium, either nuclear power or nuclear arms. Nuclear power, we are dealing with essentially a strange technology of boiling water which in turn turns into steam and generates electricity that way. It is essentially the same as a coal fire plant, only the technology is much more expensive and much more risky. To say that there are no hazards in nuclear power plants would certainly be understating the case. There are hazards and some of the workers have been over exposed.

This is the temporary storage of high level radio-active waste. The fuel bundles, it must be pointed out that this is only a temporary measure, that eventually these storage areas will fill up completely and to date, no one knows anywhere in the world, in fact, what to do with these highly radio-active fuel bundles on a permanent basis.

In the case of plutonium, that is required that it be kept isolated from the environment for a quarter of a million years, which is theological time almost. One wonders how important nuclear power is. In Canada, of all the energy we use, less than two per cent is generated by nuclear means, and we Canadians waste more energy than any other people in the world, including Americans, who have a lot of experience in that area. We waste between 30 and 40 per cent of all the energy, and here, at the Four Seasons Hotel in Montreal, we can see one prime example. I will leave it to you to consider whether this is a reasonable use of energy when in the winter, you have an uncovered pool and waste energy in this obviously visible manner. Remember this, if you were to reduce waste by cutting it in half, which would not even require to change the standard of living, we would then have more than 10 times the energy that is now being produced at high cost and at high risk by nuclear means.

This particular poster by Environment Canada shows that wood today produces more energy than nuclear power plants do in Canada.

The other application is, of course, nuclear arms and I am sure that all of us are aware of the increasing risk to all of us. This is the bomb that contained the uranium mined in Port Radium.

This is an actual slide of the explosion above Hiroshima with these very tragic results. Remember this, that all the explosive power used in World War II added up to about three megatons today, as we are sitting here in the Soviet Union's and United States' nuclear arsenal, hydrogen bombs exist, where a single such bomb has more than eight times that explosive power, one single hydrogen bomb having more than eight times the explosive power of all the explosives used in World War II including the two atomic bombs.

Things are becoming sophisticated. Here you can see at the left a Trident nuclear submarine, which is capable of wiping out 408 major cities anywhere in the world within a 6000 mile range within 20 minutes, and some 20 of these submarines have been ordered and are being built. Here we launch such a missile and again we have this kind of a result, and I think I will leave it on that particular note for now. I would like to go back to my presentation. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you very much, Mr. Moelaert. Proceed with your presentation, please.

MR. MOELAERT: Thank you, Mr. Chairman. One of the questions that has come up in this Assembly is a very valid one. Namely, what and who do you believe when you hear obviously conflicting evidence, and there are some guidelines I would like to make, some suggestions for you to consider in order to resolve this particular question.

It has been stated by a previous witness, Dr. Gordon Atherley, not to trust the experts. Well, I would qualify that by saying unless they substantiate the kind of information that they submit to you. One important bit of advice I could give you, as a communication consultant, is that when you always differentiate between facts and viewpoints, you are well on the way to a good conclusion. I will endeavour in this presentation to differentiate between opinions and facts, and unlike many other witnesses, I will give you the sources for the information that I give to you.

When you consider information from the nuclear industry, whether they are from mining companies or whether they are from AECL or AECB, please always remember that their information is coloured and often shaped by their source of income. By way of analogy, if you really wanted to know whether or not smoking is bad for your health, would you seek the advice of a doctor or a tobacco salesman?

Radiation Exposure Is Harmful

So, I will give you facts, because that is what we need, and here are some of them. Uranium and its daughter products -- and that term "daughter" was coined before women's lib, or else they might have called it person products or children products, who knows -- but anything bad in the past always was given a female name, like hurricanes. Anyway, uranium and its daughter products are, we know, radio-active, except the very last one in the decay chain which is lead.

Secondly, we know, and there is no question about this, that radio-activity can cause cancer and birth defects. Significantly, an increasing number of people in the medical profession agree that there are no safe levels when it comes to health effects. Probably one of the most eminent scientists in the United States, Dr. Karl Z. Morgan, who is known as the father of health physics and is at the Georgia Institute of Technology -- this is a quote I would like to share with you. "All radiation exposure must be considered potentially harmful to the cell and to the individual."

Still in plain language, I would like to remind Members of the Assembly that there is no antidote for radio-activity, nor can we sense it ourselves. We can be overexposed right now and none of us would know about it. Worse, it is accumulative. Watching so many hours, at close range, colour television; getting some X rays; living close to a uranium mine; all these things together add up and increase the risk of cancer or genetic defects. Nor when there is a spill and there is radio-active contamination of the environment can such radio-activity be neutralized.

Third, and again this is amazing perhaps, there is a lot of agreement between people opposed to nuclear power and uranium mining, and those in favour of it. We agree on many things. For example, that a half-life is a period that a radio-active substance requires to lose half of its radio-activity. For uranium, that half-life is four and a half billion years, approximately the age of the earth.

When uranium is mined, 85 per cent of the ore's radio-activity remains in the tailings. In other words, most of the problems remain behind and are more severely exposed to the environment than before mining it. The source for that comes from the geological survey circular 814 which you can receive free of charge by writing to the United States Department of the Interior. This particular quote is on page six. As I said, I will give you facts and I will give you the sources for them.

Management Of Radio-Active Tailings

Sixth, probably crucial in this debate, is the fact of the matter is that though there are many theories as to how to manage radio-active tailings, there is no proven technology to prevent the escape of radio-active contaminants. In fact, I would like to quote to you, from the United States nuclear regulatory commission, which says "Uranium mining and milling are the most significant sources of radiation exposure to the public from the entire uranium fuel cycle."

Even the Atomic Energy Control Board's consultative document C-1, which I have copied and distributed to Members of the Assembly, states and I quote: "A minimum period of 10 years will probably be needed to address the true long-term aspects of uranium tailings management."

In other words, it will be at least 10 years before they can even seriously grapple with it, let alone solve it. This 10 years must be a magic figure, because they have said this for the last 20 to 30 years -- give us 10 years, have faith in us and be confident that we can solve this problem when given this time. Ladies and gentlemen, that is not science, that is theology, such an act of faith, and experience shows that they have not solved this problem yet. I for one believe that it is immoral to proceed with a problem this serious without a solution being at hand.

Obviously, time does not exist to permit me to go and describe to you all the various radio-active contaminants which remain behind in the tailings. I would like to touch upon one or two and only briefly. The Saskatchewan research council in a recent report showed that downstream from a uranium mine in northern Saskatchewan near Dubyna Lake, the levels of radium-226 were up to 1500 times background in northern pike; up to 11,000 times background in plants, and as I explained in the presentation of the slides, this concentration goes up even after it is absorbed by other forms of life.

It is important also to point out that radium has a half-life of 1600 years. There is general agreement among scientists that it takes 10 such half-lives before any radio-active substance reaches levels of radio-activity that are no longer considered to be a serious hazard, so that in the case of radium we are speaking of approximately 16,000 years. After that you do not have that much to worry about, except for one thing, and that is when you have the tailings. One of those daughter products is thorium-230 and that has a half-life of 80,000 times 10, 800,000 years it will be in those tailings, and as it breaks down it then gives birth, if you like, to such products as radium, as radon, and so on. So even if the radium and radon disappears it is continuously being replenished by substances such as I mentioned, thorium-230. So, we have here the fact that radium can and does escape beyond the mine site, works into the food chain, concentrates as it does so and we should also consider human fallibility. We can design all kinds of tailings ponds that look good on paper, but in reality often they do not live up to our expectations.

Radium Is Extremely Hazardous

I would like to also share with you a very important quote, I believe, that was made during the hearings of the British Columbia royal commission by a Dr. Donald Langmuir, who is a professor of geochemistry at the Colorado School of Mines and he said: "Radium is extremely hazardous. Few geochemists would do research on it. We do not want to be jeopardized by the research activity." After the experiences of the Curies and others, this is quite understandable.

We have heard also a lot about radon, but some things were left out that I think you should be aware of and also, this came out as a result of the royal commission in British Columbia. The Los Alamos Scientific Laboratories prepared a report entitled, "Uranium Mill Tailings, Environmental Implications" in February, 1978. One quote of significance to you may be, and I quote: "Our research indicates that 12 feet of clay are required to reduce the radon exhalation rate by 99 per cent and the remaining one per cent is still four times the typical soil exhalation rate."

That is no mean feat, 12 feet of clay, because many times literally hundreds of acres of tailings are to be dealt with. Also a concern, as I mentioned earlier, are the federal regulations of the government and the nuclear industry, which are grossly inadequate, and this is not an opinion. This is a fact, as agreed by the federal government.

I would like to make you aware of Bill C-14. Bill C-14 was introduced on November 24th, 1977, with the explicit purpose of tightening up present regulations covering the nuclear industry, including uranium mining. It was in response to a recognition by government that present regulations are inadequate. Now, that is almost four years ago and even that is not adequate, but that bill has never gone past first reading. It is still gathering dust. With the constitution, inflation and other things, I do not think they will get around to this for some time.

What about present regulations? I have here with me a quote from an affidavit given by three members of the environmental protection service, Environment Canada in response to a question by a lawyer. This was in connection with the proposed uranium mine at Birch Island in British Columbia and it says -- the lawyer asked: "If Rexspar", that was the company involved, "complied with the regulations under the Fisheries Act as to the amount of radium-226 they could dump into the water, would they drink the water of the North Thompson River and all three of them replied they would not."

Conflict Between AECL And AECB

There is obviously a conflict of interest between Atomic Energy of Canada Limited and the Atomic Energy Control Board. The conflict is that one is supposed to promote nuclear power and the other one is supposed to control it and both are responsible to the same Minister, namely, the Energy Minister, Marc Lalonde. So, whenever the two do not agree, which is not all that often, the Minister of Energy would then find himself in the position of being both the accused and the judge, and I will leave it to your own imagination what happens in circumstances like that.

It is also interesting to note that according to a recent article in Maclean's the budgets vary greatly. The budget for the Atomic Energy of Canada Limited for 1981 is $295 million and one-thirtieth, namely $15 million, has been allowed for the AECB. There seems to be a disparity there as well.

We hear a lot about standards and how safe they are supposed to be. Well, again I will give you some facts. The present standard in Canada today for nuclear workers is five rems, and that is 5000 millirems. I think I will call it 5000 units. It may be easier for the interpreters, 5000 units. How safe is that? Well, when the United States and Canadian army personnel were exposed to less than 1000 of those units during nuclear bomb tests in the United States in the 1950's, the result has been that these people today have an incidence of leukemia four times that of the non-exposed population. My source, the Journal of the American Medical Association, October 3rd, 1980.

Let me put it another way, 5000 of those units is equivalent to one chest X ray every other day. How many of you would consider it safe to have a chest X ray every other day? In so far as nuclear negligence and cover ups are concerned, there appears to be no end of that, but maybe during the question period we can get back to that. It is a long, long list.

Insurance Companies Will Not Cover Radio-Active Contamination

Another interesting aspect I would like to mention is that there is no insurance available in Canada or anywhere else in the world that will cover your property against radio-active contamination. Here is an insurance policy and when you get back home I would like you to look at your own home-owner's policy, because most people do not go beyond the first page, but if you are patient and thorough, as you should be and you get to the fine print, no matter where you live, no matter who your insurance company is, there is always in very fine print a clause under "losses excluded" that states: "...any loss or damage caused by contamination by radio-active material...." It is such small print that you have to have very good eyesight to read it and maybe there is a reason why they printed it that small. Now, the question arises, if uranium mining and if nuclear power are that safe, why is it that no insurance company is prepared to insure people against its risks?

We hear that uranium is necessary or else Canadians will freeze in the dark, because we need it for nuclear power. That is an opinion. The facts are, and this is the most conservative figure I can get hold of, that 85 per cent of all Canadian uranium is not used for nuclear power plants in Canada, but is exported, some of it as a matter of fact, to the Soviet Union and who knows, maybe one day we will get it back in the form of bombs.

Tailings mishaps are very numerous indeed and I am puzzled by a statement made by a previous witness, Mr. M.B. Zgola, who on page 862 of your Hansard described uranium tailings as, and I quote, "...roughly the same..." as other tailings. I do not know of any other tailings that can contaminate areas as large as uranium tailings have, and I have mentioned one to you in New Mexico, with such long lasting and very serious results as uranium.

Is uranium needed for cancer treatment? They are really groping for reasons to justify uranium mining. Well, I was wondering about this myself and I have written to Dr. R.T. Morrison, the head of nuclear medicine of the Vancouver General Hospital and I asked him that very question. This is what I got back. If Members are interested I will be glad to provide a photostatic copy of the letter, but this is what he said in part: "I have been closely associated with the use of radio-active material in medicine for the past 20 years and I can assure you that there are no past, present or prospective direct uses of uranium in medicine."

I believe it has been mentioned by other witnesses that in the case where radio-isotopes are needed they can also be produced by a cyclotron, like the triumph at the University of British Columbia. No nuclear reactor is necessary for that.

Unfairness To Witnesses In Uranium Debate

I think it is also important to point out and this is an opinion and I would like to hear your comments during the question period on it, the unfairness that prevails in the pro and antinuclear debate, because the illusion is that by having witnesses on both sides of the issue, the issue is dealt with fairly, but the fact is, differently. I would like to point some things out to you.

First of all, most of the witnesses, including myself, who are opposed to uranium mining are rarely compensated for their time while those of the nuclear industry and the government agencies get full salary, all their expenses paid and so on. When I was invited to address the Assembly on February the 26th or the 27th, I was in Yellowknife for about one week and as you know for various reasons several of the witnesses, including myself, could not be heard at that time. In this particular case, I prepared my presentation on Tuesday, travelled to Calgary on the Wednesday and came here yesterday, when I had been assured I would be able to make my presentation and was not able to do so. I have just this morning again cancelled my reservations and expect to fly out of here tomorrow. I believe, and I would like to get your comments on that, that witnesses who are not compensated and witnesses who have to come very great distances, like Dr. Gordon Edwards from Montreal, should be shown greater courtesy and consideration when they come this far and somehow arrangements should be made that when they are told they can speak at a certain time, that in fact they can.

What do Canadians receive for their multi-billion dollar investment in the nuclear industry? Well, multi-million dollar deficits which, when they are not paid, and that is often the case, they are forgiven. There must be a lot of you here who would love to have their mortgage forgiven. There is also a lot of incomplete and misleading information, including from pro nuclear witnesses at these hearings. Since I have 10 minutes left, according to my watch here, I will only give you a few examples.

Unreliability Of Statement From Atomic Energy Control Board People

One is of particular significance to this Assembly. When Mr. Zgola of the AECB testified, on page 870, MLA Nick Sibbeston asked him various important questions about what the Atomic Energy Control Board had done in monitoring the Port Radium tailings, and I am reading from Hansard the response: "...as soon as I get back to Ottawa I will definitely beat the bushes sufficiently to get the answers...." I have checked with Mr. Sibbeston and I have checked with some other MLA's, and it is my understanding that none of that information was in fact forthcoming. Your MLA, Dennis Patterson, on May the 11th sent a telex to AECB reminding them of this information being necessary. That is some two months later and the AECB response was, and I quote: "The AECB is not presently involved in any monitoring program on uranium tailings in the Northwest Territories."

Does that mean they were involved until last week, last year? Were they ever involved? We do not know. So another telex was sent, and only two days ago a response was received using several, I would say well over a hundred, words to say "no". Again, time does not permit me to go into it, but that is the fact. Here we have the oldest uranium tailings, which would have given an excellent opportunity to monitor the effects on the environment, and this was not done. How reliable are these statements from people like that? I leave that to your imagination.

We also heard from Dr. Chambers yesterday that four trips by a stewardess to Halifax from Vancouver is roughly equivalent to what uranium miners get. This is simply not true, because the standard is not 20 units, as had been suggested -- although some uranium miners may only get that -- because the standard today is 5000 units.

Dr. Myers has made so many statements that simply cannot be backed up that I cannot deal with all of them. Dr. Edwards has been kind enough to take issue with some of them, and has circulated a letter, which I believe all the Members of the Legislature now have, in which he shows that many of these statements are simply not correct.

However, one of them I would like to share with you right now. Again in Hansard, on page 848, Dr. Myers said that the very excellent report prepared by the British Columbia Medical Association, this one here, I believe it is one of the very best available to date, Dr. Myers said, when asked if he was aware of it, and I quote: "...it is not available at present to the control board". I have since phoned the British Columbia Medical Association, just prior to leaving on Wednesday, and I have been assured that this report was available to anyone, including the Atomic Energy Control Board, simply for ordering it and paying $25. It is a matter of speculation as to whether the nuclear industry's spokespersons mislead members of government and the general public by accident or by design, but some of the language used certainly does not contribute to clarifying nuclear issues.

Some examples: Radio-active leaks are described as "significant events"; cancer, leukemia, death are described as "biological changes". I find it very fascinating to see that the brochure was prepared by the British Columbia and Yukon Chamber of Mines. This one here is almost identical to the one that is now being circulated here under a slightly different name, namely the Northwest Territories Chamber of Mines, almost word for word, the same. For those of you who like fiction, it is definitely an interesting document, but it does use terms such as "biological changes". Well, it has a nice ring to it, but cancer does not, and maybe that is why they use those kind of terms. Another one from the nuclear industry is worth sharing, "100 per cent of the subject biota exhibited mortality response". This means all the fish died.

---Laughter

No wonder the nuclear industry has received the doublespeak award by the national council of English teachers. Terms like "acceptable levels" are meaningless. They may be acceptable to some bureaucrat in Ottawa, but they may not be acceptable to the people who have to face those levels.

A Matter Of Values

The question as to whether uranium mining should be allowed to be resumed in the Northwest Territories is not purely a scientific one, as I said before, it is a matter of values. Because of the shortness of time, I will just stop here. Whatever else I have to say, I assume I will have the opportunity to make some concluding remarks at the end. So, we are five minutes ahead of schedule. Thank you very much.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. We are going to adjourn until 1:00, and I think Mr. Speaker would like to make an announcement before we adjourn. Also, the education committee will meet in the caucus room right after this. Proceed, Mr. Stewart.

HON. DON STEWART: Thank you, Mr. Chairman. I request unanimous consent of this House to change the sitting hours for today, because they are different than those stated in the orders of the day yesterday. I am suggesting the sitting hours will commence this afternoon at 1:30 p.m. until 5:30 p.m., and from 7:00 p.m. until 9:00 p.m. This will accommodate three of the uranium presentations for today, and it is my intention to set hours for tomorrow morning, starting at 8:30 to 11:30, which will accommodate the other two speakers, so they can catch the aircraft going south. This then will conclude the uranium debate. Do I have unanimous consent to change the hours?

CHAIRMAN (Mr. Pudluk): Is it agreed?

SOME HON. MEMBERS: Agreed.

---Agreed

CHAIRMAN (Mr. Pudluk): When we get back at 1:30 this afternoon, there will be a question period for Mr. Moelaert. We are recessed until 1:30.

---LUNCHEON RECESS

CHAIRMAN (Mr. Pudluk): The Chair recognizes a quorum, and we are going to go back to the same. I wonder if Mr. Moelaert will come to the witness table, please. We will have one hour for question period. Are there any questions from this House? Mrs. Sorensen.

MRS. SORENSEN: Yes, I guess I will start off. Mr. Moelaert, my question concerns the statement that you made that you were opposed to uranium mining. I just need some clarification on that. Are you saying that you are opposed to it because there is, among other things, no safe way to dispose of uranium tailings as an after effect of the mining and milling, and because of that, you feel that it would be immoral to proceed with mining and milling of uranium at this time? Am I correct in paraphrasing what you said this morning?

CHAIRMAN (Mr. Pudluk): Thank you, Mrs. Sorensen. Mr. Moelaert.

Opposition To Mining Of Uranium As It Now Exists

MR. MOELAERT: Mr. Chairman, I guess it would be fair to say that I have both primary concerns, this is the one that you just summarized quite accurately, and a secondary one. The secondary ones are the uses of uranium, which at the present time are limited to two technologies, neither one to which I prescribe. That is a point. I would also like to say for clarification that I am not opposed to uranium mining in absolute terms. What I mean by that is that I am opposed to uranium mining as the state of the art now exists. If, at any one time in the future, it could be demonstrated and by that I mean proven, not just some conjecture, that uranium could be extracted safely and that the radio-active daughter products could be kept isolated from the environment for the periods of time that they would have to be kept isolated. Furthermore, that the uses for uranium could in fact be used to the benefit of mankind, I certainly would have no objections.

My main objective in so far as uranium mining is concerned is that since it is generally admitted that dangers exist and that the technology of keeping the contaminants in the tailings from escaping beyond the mine site into the food chain is still not dealt with adequately. I feel that prescribing to the theory that within 10 years they will have a solution is a little bit like saying I know the brakes on my car do not work, but I am confident that by the time I get to the bottom of the hill, I will have them fixed. Some nuclear proponents, I have asked would they like to board an aircraft if the pilot said we have some engine trouble, but we will try to get it fixed on the way over. This is the point. We are proceeding with a problem without having a solution on hand.

Another comment from the pro uranium faction is that yes, they did makes mistakes in the 1950's and in the 1960's but that they have learned a lot and the things are a lot better today. Well, I am sure they could not be much worse, so I have to agree that they are better. The point that I would like to remind everyone of is did the mining executives in the 1950's and 1960's say at that time, we are making quite a few mistakes right now, but by the 1970's or 1980's we will have them fixed up? They did not. At that time we were told precisely the same thing we are being told today, that there is nothing to worry about. In my introductory remarks this morning, I mentioned to the Assembly that we all seem to be blessed with 20/20 hindsight, and what we need right now is 20/20 foresight. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mrs. Sorensen.

MRS. SORENSEN: I would like to pose then a hypothetical situation arising from what you have just said. Say the technology did exist, say within a few years the technology to safely dispose of the tailings and to address the problem of radiation and radon gas contaminating the environment was reached, would you then say that you could support the mining of uranium, I ask this because I notice that you have mentioned as a criteria that there needed to be changes or modifications to the uses of uranium in your reply to me. So, first of all, could you answer the first question and then could you move into what you mean by "uses" of uranium?

CHAIRMAN (Mr. Pudluk): Thank you, Mrs. Sorensen. Mr. Moelaert.

Complications Of Radio-Active Waste Intensify

MR. MOELAERT: Mr. Chairman, I do not think it would be responsible for anyone to divorce the uses of uranium from the mining of uranium because as it stands today, the complications of radio-active waste intensify as we work our way through the nuclear fuel chain of which uranium mining is only the front end. So that if we could mine uranium safely and then ignore the fact what are we going to do with it, I do not think it would be the right approach.

Now, if, for example, uranium could be mined safely and the tailings be managed safely and nuclear power could be generated in a way in which the resultant radio-active waste could also be adequately and safely dealt with -- I would like to remind you that one of the by-products of nuclear power is plutonium and the plutonium has a half-life of something like 25,000 years, it must be kept isolated on the basis of 10 half-lives, something like a quarter of a million years, so it is no small feat. Nevertheless, these things could be dealt with adequately, that the technology would develop to a point where such wastes could be kept isolated for the required periods of time, and also questions like whether nuclear power plants could be decommissioned, meaning after they have run their lifetime which is expected to be something between 30 and 40 years, they could be decommissioned adequately. If all these criteria could be met, surely I would not have any further objections.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mrs. Sorensen.

MRS. SORENSEN: You have said that it would be irresponsible to divorce the production of uranium or the mining of uranium from the uses. Are you saying then that it would be immoral for a legislative body to allow the mining of uranium if that uranium could be used for the production of an atomic bomb?

CHAIRMAN (Mr. Pudluk): Thank you, Mrs. Sorensen. Mr. Moelaert.

MR. MOELAERT: Mr. Chairman, I would say I consider it irresponsible. It does not behoove me to tell this Assembly how they should conduct their business, but, yes, I feel that like a drug use, certain drugs that are on the market today are not used for medicinal purposes, but simply as a means of getting a high. I think to produce drugs and say, well we do not use them, we simply exported them, what they do with it is none of our business, I think is a similar analogy. I think we have to address the question as it has been by the way in Saskatchewan during the Cluff Lake inquiry, and as it was very much so in British Columbia during their royal commission, we must address the question what is it being used for?

Now it is quite conceivable that some time down the road, five, 10 years, who knows, a use for uranium may be found which may be very beneficial to us, and a safe way of using it. If at that time also, we have mastered the technology of dealing with the problems or uranium mining, then I do not think any rational person would be opposed to the mining of uranium. So that is a very time oriented problem as I see it, and not having been endowed with clairvoyant powers, I do not know how things will change down the road. If I sound hypothetical with my answer, it is because you posed a hypothetical question to me.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mrs. Sorensen.

MRS. SORENSEN: Would you say then that your mission in life with respect to the position you have taken on uranium development is to stop or to use every measure that you can to attempt to stop the mining of uranium until such a time as it is no longer used for atomic bombs?

CHAIRMAN (Mr. Pudluk): Thank you, Mrs. Sorensen. Mr. Moelaert.

MR. MOELAERT: Well, I will not call it my mission in life. It is not what I would spend all my time doing, but whatever contribution I can make in sharing information and most importantly in focussing information that is being presented both from the pro and antinuclear side, I believe I can make some contribution in clarifying these issues, as was done in British Columbia, I am sure similarly here, if all information is made available to the public and, of course, to the Assembly. I like to believe that there is enough common sense here, as there was in British Columbia, that given this kind of information that people will make the right decision.

To answer your question specifically, yes, I will do whatever I can which, of course, is limited, seeing I am only one person, to try to stop uranium mining at this time and for the reasons that I think I have adequately explained.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. Noah.

MR. NOAH: (Translation) Thank you, Mr. Chairman. I have questions for the witness. I think there are four questions. My first question, it is my understanding...

CHAIRMAN (Mr. Pudluk): (Translation) Just a minute, can you wait for a few minutes? (Translation ends) It is on channel four. Try again, Mr. Noah.

Sale Of Uranium To Other Countries

MR. NOAH: (Translation) Thank you, Mr. Chairman. I have questions to Mr. Moelaert. My first question, is it my understanding that in Canada they could sell uranium to the European countries, to West Germany, Japan or even to Africa? Is that true that Canada could sell uranium to other countries? My supplementary question, if Canada sells uranium to the European countries, the people that buy uranium, what do they use it for? What do they use the uranium for? What do they make out of it?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Mr. Moelaert.

MR. MOELAERT: Mr. Chairman, I guess we just had an example that technology does not always work, and I apologize I did not get the question at the beginning.

To answer the questions of Mr. Noah, Canada can and does sell uranium to those countries, as I understand it, they have signed the non-proliferation treaty and the uranium is used by those countries allegedly for the production of nuclear power. It must be understood, however, that the uranium does not always remain in the country to which it is exported. Sometimes, as in the case, for instance, of some of the uranium that has gone to the Soviet Union, it is there enriched and then finds its way back to other countries. So it does not always remain in the country to which it is exported.

Now, what guarantee we really have that all the uranium is in fact used for the production of energy by nuclear means, it is again an act of faith. I think there can be little doubt that some of it does find its way into nuclear arms production, but that, as I must admit, at this point is a matter of speculation, with the one exception that I can think of immediately is that the uranium and the kind of technology which was exported to India did in fact result in that country acquiring a nuclear bomb.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. Noah.

Price Of Uranium

MR. NOAH: (Translation) Thank you, Mr. Chairman. My third question, when Canada sells uranium to the rest of the world, how much do they pay for an ounce of uranium? How much would an ounce of uranium be if it was sold to outside Canada? That was my third question, and my fourth question, I will ask after your reply.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Mr. Moelaert.

MR. MOELAERT: Thank you, Mr. Chairman. The price of uranium like that of silver, gold, and other minerals does fluctuate from time to time. It is important to point out that the price of uranium was at least fixed artificially by the international uranium cartel in which Canada was a major member, and the price of uranium was as a result artificially increased to about $50 a pound about two years ago. Today, however, the spot price is about $27 per pound.

I would like to just clarify this again. In 1971, uranium sold for four dollars a pound and as a result of the artificial price fixing in which Canada broke its own anticombines legislation, the minister increased the price up to $50 a pound, but it has since dropped considerably. In addition to that, I would like to draw your attention to something that very few people appear to know, that when Canada was involved in this cartel, the government responded when this became public knowledge in the United States, by issuing an order in council in September, 1976, which stipulated that any person giving information how Canada participated in this cartel would be subject to a maximum prison term of five years or a fine of $10,000.

I have subsequently written to Marc Lalonde who was then the minister of Justice, and of course today he is the Minister of Energy, the question I asked, and I think that the House should know, is if this order in council is still on the books, and if his government had any intention of rescinding that order? The answer that I received from Mr. Lalonde was, yes, to the first question and no, to the second.

So the only change that has taken place in that order in council is that it was amended in October, 1977, to exclude members of the public, but it still applies to members of the nuclear industry at large. The reason it was so changed is because in Washington, the House subcommittee on oversights and investigations forced Gulf Oil, one of the participants in the cartel, to divulge the information how the cartel operated, and so while Canadians were not able to obtain all these details, the pricing schemes and so on from Ottawa, they could get that information quite easily in Washington. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. Noah.

MR. NOAH: (Translation) I have two other questions. If uranium has many variations, cesium-137 or others, how would it affect the wildlife and the lands surrounding it? Would you give us an example of how it would affect the wildlife? My last question is, if Canada exports to other countries, and I seem to understand that Canada is exporting nuclear weapons, is giving arms to the other parts of the world, Canada is selling uranium and other dangerous things to the rest of the world. It seems that Canada is asking for war, or something dangerous to the human race, for instance bombs and other material that is dangerous to the human population. Would it not be dangerous if we were selling weapons to the rest of the world, do you not think that there will be a third world war? If there were to be a third world war, I think this could -- if we did have a third world war, it seems to me as if Canada is contributing to it.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Mr. Moelaert.

Products Of Nuclear Power Plants

MR. MOELAERT: Thank you, Mr. Chairman. To the first question, I believe Mr. Noah referred to cesium-137, which is a product of nuclear power plants or any fission such as nuclear bombs. It is not present, as far as I know as a result of uranium mining. Nevertheless, it is a very dangerous substance, and as a result of high level radio-active wastes of nuclear power plants, it can effect entry into the environment, and certainly as a result of nuclear bomb tests, especially the ones that are held in the atmosphere. It is important to understand that not all nations having nuclear weapons have signed the treaty banning such tests, notably China and France. Of course, it makes no difference who explodes the nuclear devices, because we would suffer very similar consequences no matter who, in fact, explodes it.

One good example to draw your attention to this, and understand how quickly this kind of pollution can take place, I think, was demonstrated quite graphically by mother nature itself when, about a year ago, Mount St. Helen blew its top, and the volcanic ashes circled the world in something like less than 48 hours. A major nuclear explosion would be similar in explosive power. So that kind of fall-out also circles the world, not just once but many times, and deposits, depending on prevailing winds and other weather conditions, substances such as cesium-137, such as strontium-90 and other radio-active contaminants onto the earth. Then often it is absorbed by plant life and, again, may be eaten by animal life, and we, being in the top of the food chain, may ingest it that way, either directly that way or by, in the case of some of these substances, by inhaling the air that is thus polluted.

Canada's Contribution To Nuclear Arms Race

On the second question of Mr. Noah, as to whether or not Canada is contributing, in fact, to the nuclear arms race, I think that is a very valid question to ponder, because even though Canada does not export nuclear weapons and to the best of my knowledge does not produce any, we must understand that whenever you export a CANDU reactor, which to the best of my knowledge produces something like 500 pounds of plutonium per year, you thereby give the country taking the CANDU reactor the capability of producing many nuclear bombs. A crude atomic bomb requires only 10 to 20 pounds of plutonium.

As far as whether or not we will be facing a third nuclear war, Albert Einstein, the noted atomic scientist, said, when asked whether there would be a nuclear war, and a third world war, he said he did not know about that. He was only sure that if it did take place there would not be a fourth world war. As the international physicians for the prevention of nuclear war are stating repeatedly, a nuclear war cannot be won and cannot be survived, so I would say whatever we can do, we should do in trying to reduce and preferably eliminate the proliferation of nuclear weapons, and I certainly share Mr. Noah's concern in that regard. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Are there more questions? Mr. Patterson.

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. Mr. Moelaert, I think, now that we have heard a number of witnesses, and sorting through the information, we are starting to see serious contradictions in fact. Particularly one that I have noticed is the suggestion by, I believe it was Mr. Zgola, and the witness yesterday, Dr. Chambers, that tailings really are not radio-active. They are minimally radio-active, they are only slightly different from any other kind of tailings. Yet you have quoted us an apparently reputable study that says that after milling in a uranium mine, 85 per cent of the radio-activity in the ore is left behind and is still there in the tailings.

Now, I would just like to pursue this a little bit further. Would you be willing to say publicly that witnesses like the one from the Chamber of Mines, and likely Mr. Zgola from the Atomic Energy Control Board, are deliberately misleading this Assembly with this information? Would you be willing to make that charge and, if so, how can you account for this? Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Mr. Moelaert.

Unreliability Of Pro Nuclear Witnesses

MR. MOELAERT: Thank you, Mr. Chairman. I do not think it would responsible for me to speculate as to why they are giving you the information they do. Whether some of the information which is, in fact, incorrect, is shared on the basis of ignorance or because they are trying to mislead the public is an open question. I cannot look into their minds. The experience I have had with people from the nuclear and uranium mining industries is that they find it exceedingly difficult to look beyond the financial balance sheets and recognize the human factors involved in uranium mining and nuclear power and so on. I do not think that there can be any doubt that, on some of the points that have been raised by other witnesses as well as by myself, and a very good case in point, the Assembly now has access to, thanks to you, Mr. Patterson, among others, is that what they say is not always reliable. It is well demonstrated, I think, with the failure of Mr. Zgola to follow through with the pledge he made to this very Assembly in getting information to the Assembly as to what, if anything, the AECB has done in terms of monitoring the tailings in Port Radium. As you well know from direct experience, although several months went by, no such information was given, even though Mr. Zgola assured the House that as soon as he got back in Ottawa he would beat the bushes to get that information. I suggest to this House that it was more like beating around the bush, and only then, after you specifically asked whether any of this monitoring has taken place, and even then, as I read into the record this morning, the answer was ambiguous, by saying the AECB is not and here comes the evasive word "presently" involved in monitoring these tailings. It is left, the question, partially unanswered, because we did not know whether they had at any time done so. Then the second telex that you sent, of which we received a copy, makes it quite clear that no such monitoring has taken place at all.

So, maybe this is a roundabout way of answering your question, but I think there are enough examples here before the Assembly that makes it crystal-clear that some of the evidence presented by some of these members on the pro nuclear side simply is not reliable.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. Patterson.

Port Radium Mine Site

HON. DENNIS PATTERSON: Would you say that this site of the uranium mine in the Northwest Territories at Port Radium provides us with an opportunity to look at the disposal problems of contaminants of tailings in the unique environment of the Territories? Would you have any recommendations about what should be done in view of the Atomic Energy Control Board's admission that they have not followed up on the effects of that mine to date?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Mr. Moelaert.

MR. MOELAERT: Thank you, Mr. Chairman. I would say an excellent opportunity for very valuable research data was missed by the AECB in not examining, not merely the tailings themselves, but the contaminants, to see to what extent they have travelled through the biological pathways. By that I mean to what extent they have affected the plant and animal life in the area, because, as I said this morning, these represent the oldest uranium tailings in all of Canada,

and so a very excellent research opportunity, the results of which could have been very valuable to all Canadians, and certainly the Members of this Assembly, was missed. Whether this was done deliberately, or for whatever reason, is open to speculation, but I think it is also an indication that the Atomic Energy Control Board are not controlling things as well as they should, and cannot be counted on to be terribly reliable when no monitoring programs have taken place at all, as far as we know now.

Secondly, whenever we can expose their inadequacy in cases like this, they are, obviously, most reluctant and very evasive in simply saying no. It took them something like 100 words in the latest telex to admit they had not done so, when one word, "no" would have sufficed.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. MacQuarrie.

Denigrating Scientific Experts

MR. MacQUARRIE: Thank you, Mr. Chairman. Mr. Moelaert, on a number of occasions you have denigrated scientific experts. You have implied that although they might be learned that they may well be lacking in common sense or in the case of others, that they had been bought by the industry. Just a brief comment. First, I can only disagree with that. I think it is possible to have expertise and common sense too. I have witnessed that on many occasions and it is possible to have neither. Also, although I can agree with the statement that science can be bought, that is no proof at all that it is therefore bought. I would not question at all that some individuals may be bought, but I can see a great deal of dedication too.

In that area then, of expertise, you said that you would not go to a tobacco salesman to find whether a cigarette was safe. You would go to a doctor. Indeed, I would not go to a tobacco salesman either. I would go to a doctor who has the expertise in knowing whether something is medically safe or not and if that doctor was employed by the tobacco company, I still would not go to a tobacco salesman. I would go to another doctor.

I think, rather than generally denigrating expertise, is it not more proper, rather than people who are not expert challenging the factual information that experts generate, to seek balancing arguments from other experts? Are you suggesting that there are no experts in the world who are honest and dedicated to learning more about life, but also dedicated to the protection of humanity? So, the specific question -- I understand that radiation protection standards in Canada are based on recommendations of the International Commission on Radiological Protection and I may be deceived, but I understood that that body came into being with the specific purpose not of promoting the nuclear industry, but of protecting people from radiation, the hazards of radiation. So, are you telling us that these people are lacking in common sense or that they have been bought as well? Is that not an independent body? I honestly do not know that much about it and so, that question is asked in sincerity. I can only think that it is, but if you have evidence that it is not, I would like to hear that.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Mr. Moelaert.

MR. MOELAERT: Yes. I would like to make it very clear that I have a high regard for many experts in whatever area. I would also like to make it clear that I think it is up to government and the public in general through the government to make the decisions and never leave the decisions up to the experts. The experts are no more and no less than expert witnesses and I believe it is up to the legislatures to decide what to believe, what not to believe, and so on.

My point about the tobacco salesman, which I think is a relevant one, is to draw the analogy between the kind of evidence you have heard. There were experts here, including Dr. Woollard, and as I have said before, and I have read a lot of documents, I believe that this is one of the best documents available today on this. This is the other side of the fence of the tobacco salesman, because the British Columbia Medical Association has really nothing to gain in so far as stopping uranium mining is concerned. They do that because they are genuinely concerned.

I am saying to you, as I said this morning, that members of the uranium mining industry cannot claim such impartiality. In so far as the ICRP is concerned, I would like to draw your attention to the fact that the standards that they recommended in 1959, I believe, took something like 16 years before they were implemented by the government in Canada to apply it to uranium miners in Ontario. This came out in the hearings for the British Columbia royal commission and when one of the witnesses from the Ontario labour department was questioned on this, his explanation was to implement those recommendations, those standards, earlier than that was difficult because the uranium mining industry simply could not afford it, because at that time the uranium mining industry was in a slump. As you know, the uranium price had dropped during that particular time. So, here I think we have a good example that standards are often set with the economic aspects in mind and if we have a high regard for bodies such as the International Commission on Radiological Protection, I believe that is the full name, then we may question why it takes governments sometimes as long as I just mentioned, 16 years, to implement them.

Environmental Protection Must Take Precedence Over Corporate Profits

I believe, and I probably part company with the nuclear establishment on this, but I believe that public health, public well-being, the protection of the environment, must take precedence over corporate profits. Now, not everyone would agree with me on this, but that is my own particular point of view. It is up to you to decide what side of the issue you are on.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. MacQuarrie.

MR. MacQUARRIE: Yes, certainly I agree that public health should take precedence over corporate profit, but I understood that what these people are saying is that with these standards the public is protected. A brief question on that -- you can answer it later -- is, are those standards now in effect in Canada?

Then, one other little set of questions. Mr. Anderson or Dr. Anderson, I do not recall now which it is, but at any rate, the other day he did say and I certainly agreed that the public finally must make a value judgment, but he did agree with me that that is after having reviewed the best factual information that is available. So, that is what we are in the process of trying to do. We are trying to listen to experts who are very knowledgeable in the area of radio-activity and in health. Incidentally, you point out that particular study by the British Columbia Medical Association, but I would have to point out that the Canadian Medical Association did not agree with the British Columbia Medical Association's assessment of the degree of danger and did not follow up on its motion in 1979.

At any rate, will you tell me something about the range of disagreement that exists among experts with respect to the hazards of low level radiation? When I first started looking into this, I thought maybe it was the case that some experts were saying that there is an immense unknown hazard and that others were saying, no there is not. In subsequent reading, I think that the range of disagreement is much less than that, that it is actually a very small disagreement between experts about the range of difference in hazard. The question is, am I wrong in the understanding I have now? The range of

disagreement seems to be that some experts today are saying that if there is long exposure to low level radiation, that in a population of X hundreds of thousands of people you may have Y additional cancers from radiation, that is, in addition to the many other kinds of carcinomas that exist or causes for carcinomas, whereas other experts are saying in a population of X hundreds of thousands you may have Y plus Z additional carcinomas. Is that the range of disagreement or do I still not quite understand what the disagreement is, and in answering, will you address as well that first brief question please, sir? Are the standards being maintained now?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Mr. Moelaert.

MR. MOELAERT: Yes, Mr. Chairman. On the first question, whether the present standards in Canada in so far as protecting both the public and nuclear workers are adequate, in my view they are not. I have given you factual information on this, this morning, that the present standard of 5000 units, or to use the scientific term, five rems is the present standard in Canada. I have also shown you the comparison of it being equivalent to about a chest X ray every other day, because the 5000 units is per year, and you simply have to draw your conclusion.

I have asked many people, including those in the nuclear industry, and not yet found any volunteers who would like to have a chest X ray every other day and consider it safe. So again, that is a matter of value judgment.

Range Of Disagreement Among Scientists

I would also like to point out to you, I have certainly no bias when it comes to experts. I have a high regard for experts. I am just saying that some of them are in a very difficult position to be objective without jeopardizing their employment. I certainly hope that the illusion is not being created through this debate that the experts are only on the pro nuclear side, because nothing could be farther from the truth. We have many experts, many eminent scientists on the other side as well.

In so far as your key question is concerned, the range of disagreement, essentially as I perceive it it boils down to whether or not below a certain threshold of radiation exposure there are no biological effects. The body of evidence that I am familiar with is certainly growing faster on the side that no amount of radiation, no matter how small, has no effects and that as radiation increases so does the risk of birth defects and the possibility of cancer and not even, as Dr. Edwards, I thought demonstrated very capably in Yellowknife, does it go in a linear fashion. In other words, prolonged exposure to low level radiation can increase these incidences of cancer and birth defects much more sharply than a short, heavier dose.

The other thing, in order to understand this and as I said this morning, life should be a learning experience. I learn every day, including from the nuclear industry, but in order to understand it, we have to see this in context. It is not a simple matter to draw a correlation between exposure and cancer and birth defects and there are a number of factors that we have to take into account and that explains, I believe, why there is a discrepancy in interpreting some of these results.

One is that it is generally recognized that it takes at least seven years, and more likely 15 to 20 years, before the effects of radiation exposure do in fact manifest themselves in terms of cancer or birth defects. That is a long period of time and if a person has worked, say for instance, in the uranium mines, say, for five years and then moves on to some other city and a different kind of work and if after 15 years he does in fact develop cancer, especially from a legal point of view, it is no small task to prove that the reason he has cancer 15 years later is because 10 years earlier he did in fact work in the uranium mine or a nuclear power plant.

The other problem that we must bear in mind is that people, of course, move around a lot and so in order to gather statistical evidence it is, again, quite difficult because of that mobility. Nevertheless, in concluding in answering your question, it is my belief, and again this is a value judgment, that so long as serious, very serious, doubt exists about matters such as these, that we should come on the side of doubt, because we are facing the dilemma, if you like, should we proceed with a dangerous situation until totally and completely proven unsafe or should we not even start until in fact it is proven safe? In other words, does the burden of proof of safety or unsafety rest with the industry that creates this problem or does the burden of proof rest with the legislatures and the public? In that case, there is going to be quite a time lapse, as I have said before, at least 15, 20 years. By that time the irreversible damage has been done and as I said this morning, in the case of, for example, nuclear fall-out, which at that time many scientists also said there was nothing to worry about and now we know better, I think is a good demonstration that we do in fact have 20/20 hindsight. Thank you, Mr. Chairman.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Moelaert. Mr. MacQuarrie.

Committee On Biological Effects Of Ionizing Radiation

MR. MacQUARRIE: Thank you, Mr. Chairman. I am aware, Mr. Moelaert, that you believe that the standards that are applied in Canada and the industry are not adequate but my question was whether they now conform to the standards that the International Commission on Radiological Protection has set down which I believe is an independent body, so I will still ask you to answer that.

Then for my last point, I do know that there are experts on both sides. I have the report of the committee on the Biological Effects of Ionizing Radiation and that committee -- 23 people on it -- generally said it is not yet possible to estimate precisely the risk of cancer induction by low dose radiation because the degree of risk is so low, that it cannot be observed directly and there is great uncertainty as to the dose response function most appropriate for extrapolating in the low dose region. In other words, the disagreement is over the statistical method of estimating what effect there might be, and 21 out of the 23 committee members agreed with this report. I know that yesterday Dr. Woollard quoted Dr. Radford who was one dissenter to some of the findings with respect to the report -- one dissenter out of the 23. There was one other dissenter, but I get the impression he felt that this committee was too cautious in what it was doing. So, generally then, a final comment from you, if you will, on that kind of statement. Do you just absolutely disagree that that is a truthful kind of assessment of the situation?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Mr. Moelaert, you can answer that question also, while you give your closing remarks at the same time if you wish.

MR. MOELAERT: Thank you, Mr. Chairman. In so far as the standards are concerned, they are in line with some recommendations and out of line with others. I would like to point out to you that quite often we have different standards at the same time which really makes it confusing. Let me just give you one brief example.

The Ontario standard for radium in drinking water, for example, to the best of my knowledge, still today is three picocuries per litre. The federal standard is 10 picocuries and it is now being recommended to be increased to 27 picocuries. That is nine times the Ontario standard. In British Columbia they do not know yet what standard to adopt, and, of course, you get different results if you measure with a different yardstick.

Disagreement Between Various Advisory Bodies

In so far as the disagreement is concerned between various advisory bodies as to what is safe and what is not safe or how great the risk is in so far as being subjected to radiation exposure is concerned, there is no agreement for one, and it simply depends who you believe, but there is excellent reading material available on that. The most important thing I believe is that no reputable scientist that I know of has said there is no risk at all. That is the most important thing, and you have to weigh whether an additional one, 10, or 100 cancer cases per 100,000 is in fact an acceptable risk or not.

Again, as I said this morning, in the final analysis, it is a matter of value judgment. You may say 10 in 100,000 is not bad, but it is very bad if you happen to be one of those 10. I hope that answers your question before I go into my concluding remarks, but I certainly appreciate your comments and it obviously shows to me that you are reading a lot of good material and I appreciate that. Mr. Chairman, if there are no further questions, may I go into my concluding remarks then?

CHAIRMAN (Mr. Pudluk): Mr. Moelaert, proceed.

MR. MOELAERT: Okay. Just a few remarks, and again I hope this will help you. I have a report here that was prepared for you by the Science Advisory Board of the Northwest Territories and two brief comments I would like to read into the record so there is no misinterpretation. On page four of this particular document, it quotes the interim report by the British Columbia royal commission on uranium exploration and gives the impression that uranium exploration, including drilling, poses no serious risk. The quote the report uses on the top of page four is: "We wish to stress that some of the public fears expressed to us in testimony in relation to the possible hazards resulting from drilling for uranium do not, in our opinion, constitute a significant risk."

That is definitely quoted out of context and I try very hard to be factual. I have the report right here with me, and this is what it also says in the same report. It says: "A potential hazard, in our opinion, is that drill holes will disrupt the pattern of ground water flow causing a compositional change in the water and leading to contamination of a water supply previously unaffected." Most significantly, this final sentence, now listen to this carefully because we are now talking about uranium exploration, not mining: "The possibility of increased uranium content or the introduction of other constituents such as radium-226 or toxic-heavy metals associated with uranium deposits make the problem particularly difficult. The contaminated water might be used for public drinking purposes or irrigation or for the watering of livestock." That is one thing.

The other thing that I would just like to draw your attention to very briefly on this report, because I think this is very significant, on page seven on the recommendations of the Science Advisory Board, it recommends the program be undertaken to study all these aspects. Then it said, and I quote: "It should be the product of a combined effort from..." and it lists Atomic Energy Control Board, Department of Indian and Northern Affairs, the Government of the Northwest Territories and the Northwest Territories Chamber of Mines.

Well, surely, ladies and gentlemen, if you can limit your input to these bodies and these bodies alone, you are not going to get a very balanced input. The question I ask, what about public input? What about the churches, the unions, environmental groups, medical associations, and so on? So I hope you will not limit it to those that are recommended there.

The British Columbia experience has shown us that wherever uranium is mined, those who reap the major monetary benefits are never the same as those who face the major health and environmental risks. In fact it could be said fairly that

uranium mining is a give and take proposition where the companies will take the short-term benefits and give the long-term environmental and health risks, which ultimately will have to be faced by the public through taxation and so on, in so far as money is concerned, and in so far as tragedy is concerned when illness is involved.

Dene Nation Opposed To Uranium Exploration And Mining

The public health and well-being for present and -- and I would like to emphasize this -- for future generations are infinitely more important than filling the corporate coffers with ill-gotten gains. For these and other reasons, the Dene Nation is opposed to uranium exploration as well as any resumption of uranium mining.

We have heard a few witnesses make reference to emotions as though there is something wrong with emotions. I would like to give you the dictionary definition of emotions, "strong feelings". I believe and I submit that when people have strong feelings about their environment, about their health, about the well-being of their children, when those feelings are justified, that is commendable. What is despicable is when no regard is shown for such feelings at all.

We believe that if the people of the Northwest Territories are given adequate factual information on uranium mining, they will reject uranium mining as did the people of British Columbia. This Legislative Assembly is to be commended for setting this crucial information process in motion. I would like to also point out to you that the opponents in British Columbia and elsewhere to uranium mining and nuclear power are not merely misinformed individuals, but many responsible people from church groups, unions, and scientific bodies, and so on.

The Dene Nation calls for a ban on uranium mining and disruptive uranium exploration in particular which means the involvement of drilling. If the Legislative Assembly is not prepared to order such a ban, then the Dene Nation calls for (a) settlement of land claims and (b) full public inquiry with funded participation of public interest groups as was the case in British Columbia before any uranium mining proceeds. With a ban on uranium mining and exploration, this should be pending the outcome of a satisfactory conclusion of land claims and negotiations and the outcome of such a public inquiry, and I support that position.

I would like to conclude by saying that I very much appreciate the Assembly taking their time in listening to the various witnesses, including myself, and I hope you will come to the conclusion that the people and the Government of British Columbia reached. Thank you very much.

CHAIRMAN (Mr. Pudluk): Thank you very much, Mr. Moelaert, for appearing to this House. A point of order by Mrs. Sorensen.

MRS. SORENSEN: I have a motion, Mr. Chairman, that I would like to present before coffee so Members might be able to think about it during coffee.

AN HON. MEMBER: Agreed.

CHAIRMAN (Mr. Pudluk): Does this House agree?

AN HON. MEMBER: Agreed.

---Agreed

CHAIRMAN (Mr. Pudluk): Proceed, Mrs. Sorensen.

Motion To Request Review Of Effectiveness Of Disposal Of Uranium Tailings In Port Radium

MRS. SORENSEN: I move that this Legislative Assembly urgently call for a federal review, both within the federal mine safety division, located in Yellowknife, and Atomic Energy Control Board, regarding the present status, risk levels, and effectiveness of the disposal system used of uranium tailings produced as a result of uranium mining in the 1940's in Port Radium, and further that the report be tabled during the fall session.

---Applause

CHAIRMAN (Mr. Pudluk): Can we have a copy of that motion? It will be dated and translated and we will have a coffee break and think about it at the same time. Now, we will take 15 minutes for a coffee break.

---SHORT RECESS

CHAIRMAN (Mr. Fraser): Mr. Sibbeston, put that cup back in the kitchen.

---Laughter

HON. GEORGE BRADEN: Let us go.

HON. RICHARD NERYSOO: We have enough.

CHAIRMAN (Mr. Fraser): The Chair recognizes a quorum. The Members all have copies of a motion. Mrs. Sorensen, to the motion.

MRS. SORENSEN: Yes, yes. Very briefly, Mr. Chairman. Mr. Moelaert in his presentation raised the question of the uranium tailings that are now situated in Port Radium as a result of uranium mining that was done at that spot in the early 1940's. As a result of questioning by Mr. Patterson, both during the debate in Frobisher Bay and today, we have discovered that we are not at all sure whether those present tailings are being safely monitored and we are not at all sure whether the disposal system that exists has been effective and continues to be effective. It is because of that situation that I have presented that motion. I do not want to prejudge and say that anyone or any company has been irresponsible, and I feel that the responsible way to handle this situation would be to call for an immediate assessment of the situation.

Mr. Moelaert has brought to our attention the fact that the Atomic Energy Control Board was not directly involved in the regulating of the uranium mining industry in the Northwest Territories during the time when companies were involved in uranium mining in the 1940's, and therefore the Atomic Energy Control Board is not involved in the monitoring of those tailings that still exist. There may be several reasons for that, one reason being that the Atomic Energy Control Board does not necessarily have jurisdiction in the Northwest Territories, since minerals are a provincial-like responsibility. However, it is true that, were this Legislature to invite Atomic Energy of Canada to come to the North and to conduct an on-site study of the situation, and I am sure that the Atomic Energy Control Board officials would be prepared, to come and do that.

Now, I have, through quick telephone calls to Yellowknife, determined that our own mine safety division that is still located within the federal government, but soon to transfer to the territorial government, has been monitoring the present tailings pond that now exists as a result of silver mining that is going on at the same site. I have also determined that those tailings are going into the same tailings area that the uranium tailings went into, but the degree of monitoring and the effectiveness of that monitoring is still questionable. It is for that reason that I have made the motion urging this Legislative Assembly to call for not only a territorial review but, as well, a federal review of the present status, the risk levels, and the effectiveness of the disposal system for the uranium tailings. With that, Mr. Chairman, I would ask for support from the Members of the Legislative Assembly, in urging that this review be done immediately, and that a report be tabled during the fall session. Thank you, Mr. Chairman.

CHAIRMAN (Mr. Fraser): Thank you, Mrs. Sorensen. To the motion. Mr. Noah.

MR. NOAH: (Translation) Now, Mr. Chairman, I am going to be in support of the motion, but I would like to make an amendment, a short amendment, if the Assembly does not mind. Right after "Port Radium", I would like to add...

CHAIRMAN (Mr. Fraser): Thank you, Mr. Noah. I did not quite get the amendment.

MR. NOAH: (No translation)

CHAIRMAN (Mr. Fraser): "...and drilling sites in the Keewatin". Is that what you want to add after the second last line, Mr. Noah?

Amendment To Motion To Request Review Of Effectiveness Of Disposal Of Uranium Tailings In Port Radium, Carried

MR. NOAH: (Translation) Right after "Port Radium", add "including uranium tailings sites in the Keewatin region".

CHAIRMAN (Mr. Fraser): Thank you. The amendment reads, after the second last line: "Port Radium, including uranium drilling sites in the Keewatin". Is that right, Mr. Noah?

MR. NOAH: My amendment reads, right after "Port Radium, to include impact of uranium drilling sites in the Keewatin region".

CHAIRMAN (Mr. Fraser): Thank you, Mr. Noah. To the amendment. The question is called. All in favour? Down. Opposed?

---Carried

Motion To Request Review Of Effectiveness Of Disposal Of Uranium Tailings In Port Radium, Carried As Amended

To the motion as amended? The question is being called. All in favour? Down. Opposed? The motion is carried.

---Carried

We have the next presentation, by Mr. Michael Amarook representing ITC. Will the Sergeant-at-Arms see that Michael Amarook is escorted to the witness table? I would like to welcome Michael Amarook, ITC, with a presentation to the Assembly. Mr. Amarook, you have a maximum of one hour for your presentation. For the members of the interpreter corps, you will have to speak very slow so that we can get everything in. Thank you, Mr. Amarook, proceed.

Presentation By Mr. Michael Amarook

MR. AMAROOK: (Translation) Thank you, Mr. Chairman and Members of the Legislative Assembly. When I am on the subject of uranium, I am now going to talk about the dangerous parts of uranium. The subject has come up many times about uranium. I would like to talk about the dangerous ways of uranium.

The ITC has talked about the danger of uranium mining, and the radiation is a concern of the people of Baker Lake. Uranium is poison, and has been starting some dangers, and we are very concerned about it, and when we heard about them, when we heard what uranium is about, we started asking questions as to what they use uranium for, and how dangerous is it to the people and the land and to the wildlife. When they started mining uranium, what would be the peak of the danger?

Our understanding of uranium, and my own understanding, is when the exploration started, as soon as people explore and start drilling, radiation starts to be around. We first thought, at the beginning, when they started exploration of uranium, that radiation would start to be around, but we heard that as soon as the drilling starts, that radiation has an effect on the surroundings of the people. At the beginning of the drilling of uranium, the radiation is quite small, and the second time when they drill, as more drilling comes about, then the radiation increases. It could affect the wildlife and the people.

ITC has gone to some drilling sites where uranium is being drilled. In Elliot Lake, Ontario, they are mining uranium, and the people who are mining in Elliot Lake are -- there are a lot of people who are working at the mine there. They were happy that they were able to get employment there. They had good

jobs, bought houses, except the mining at Elliot Lake has radiation now. The people who are working there now have to be relocated. The people who bought houses are trying to sell the homes that they bought, except that nobody wants to buy those houses because of the uranium that is around Elliot Lake. They are just losing money on employment, money on houses that they bought, because they cannot sell the houses because of uranium. If there is going to be uranium mining in the Northwest Territories, how will we know what the effect is going to be?

Also, in Uranium City, radiation has been known to be around. They have good jobs, so they bought houses over there also, and since radiation started, they have to go. They have to relocate again, and also there they cannot sell the houses, causing bankruptcy for the people working in the uranium mines. Is this going to be the problem in the Northwest Territories?

Also, in the mining of uranium, where are they going to be using the uranium? Is it going to be used by the Canadians? Is it going to be used by the Northwest Territories people to support the people? How is it going to support the people? The subject of radiation is very dangerous, once they start drilling in the Northwest Territories. We have heard about the mining of uranium, and it has never been good. In the other mines that are going around, and the other minerals that are being mined, the feeling is that the people and the environment -- and the radiation can be used to make bombs. When I was young, I heard about the World War in 1945. During that World War we heard that a bomb would fall upon the world, on the land. Ever since then this has been a danger to everyone of us and will not be forgotten.

Effect Of Tailings From Various NWT Mines

I will speak again on the different types of mines, and I will say them all in English. Discovery Mines; two, Tungsten Mine; three, Giant Yellowknife Mines, arsenic pollution of land and water; four, Rankin Inlet Nickel Mine, discharge of tailings into Hudson Bay unknown; number five, Nanisivik, major spill of effluent from the mill into the creeks nearby; six, Baker Lake; Port Radium, effluent unknown. These things prove that breakdowns occur with things such as tailings dams or pipes breaking. There were no attempts made to correct tailings dumpings. The record is not good for all or any of northern mining ventures, and based on that record it is unlikely that uranium tailings will ever be safe.

In the area surrounding all of these mines, water is constantly being used. It is going into all the nearby lakes as well. It is very dirty and not at all good for the marine life. If any mining is done up here it is very dangerous for the environment. If any danger comes to our wildlife, if the wildlife is affected by the radiation, then what benefits will that area get out of this? If the wildlife is affected and there are no more areas to work in, what will we benefit from this; what will we get paid in return; by whom and where?

Many other things, besides money, are renewable. In 1958 I remember at Rankin Inlet the mine was open and this brought a lot of people to Rankin Inlet to work. They lost their dogs and also most of them became alcoholics. Because of these things, a lot of sicknesses came up North. These factors are just as dangerous as being exposed to uranium radiation. I am sorry but it seems that the interpreters do not understand what I am trying to say. I am sorry I did not bring my interpreter.

The danger of radiation should be realized now by most of the people. I think that there should be public hearings within the communities so that the people who represent the land can be consulted. I encourage you to put forth these public hearings. If we do not have public hearings, I am sure that the people

will not be happy because they have not been consulted with. Perhaps this Legislative Assembly has been informed by their constituents that they do not consult enough with their people. That is why I am supporting the idea of community hearings especially in the Keewatin area because most of the uranium is in that area. The thing I support is the public hearings and I want them to be supported by the Legislative Assembly.

The Legislative Assembly always wants to inquire into getting the best knowledge and having witnesses appear in front of them, and your constituents would also like to question you on your views at the public hearings. Thank you. I think those are all the remarks I have now, and I want to thank you very much, Mr. Chairman, for letting me speak. I am sorry, once again, that I did not bring my interpreter. Sometimes it is very hard to understand each other. Thank you very much.

---Applause

CHAIRMAN (Mr. Fraser): Thank you very much, Mr. Amarook. We have a question period now. I would imagine that you are prepared to answer any questions for the Members.

Proceed now with the minimum one hour question period. The floor is open. Any questions? There do not seem to be any questions, Mr. Amarook. I would like to thank you very much for appearing before the Assembly and you will have a chance to come back again and sum everything up, unless you want to sum up your presentation now, or you can wait until later. I think everybody has a chance to come back.

MR. AMAROOK: (Translation) I am sorry, Mr. Chairman, but I did not get you.

CHAIRMAN (Mr. Fraser): There are no questions, Mr. Amarook. You have a chance to come back and give a brief summary of what has happened, I think maybe tomorrow or when we wind up with everybody else. Okay.

MR. AMAROOK: (Translation) Thank you.

CHAIRMAN (Mr. Fraser): Sergeant-at-Arms, will you see that Michael Amarook is escorted out? Thank you very much. We have Dr. Walter Kupsch, I think, as the next witness. Dr. Kupsch, you have a one hour presentation, and I remind you, as I did everybody else, you will have to speak very slow and distinctive in your words for the Members of the translation corps. Thank you very much. Are you ready to proceed, Dr. Kupsch?

Presentation By Dr. Walter Kupsch

DR. KUPSCH: At the outset I should mention that I am a member of the Northwest Territories Science Advisory Board, and I have informed other board members of various aspects of uranium mining, but I am not here as a spokesman for the board. The opinions which follow are very much my own and not necessarily subscribed to by my fellows on the Science Advisory Board.

My name is Walter Kupsch and I will begin by giving you what may appear to be a rather lengthy introduction of myself. I have given this introduction careful consideration and came to the conclusion that because the essence of what I have to say about future uranium mining in the Northwest Territories is very much a personal opinion, you are entitled to become acquainted with my background, education, and experience in fair detail. I am not here to recite my own accomplishments in an attempt to establish any particular expertise in the vast field of exploring for and utilization of the uranium resource. As a matter of fact, I do not claim any such wide ranging expertise, and my introduction is merely meant to give you an opportunity to judge my peculiar bias. This bias, it will become evident, differs from that of some other witnesses who have come before you. This, of course, is to be expected as we are all shaped in our views by differing pasts and by differing current interests.

Background And Education

I am a geologist who received undergraduate training in that science in my native Holland, and I may interject here that I have just talked to Mr. Moelaert and he also is a native of that country. After a brief time in the Netherlands army, followed by participation in the resistance movement under Nazi occupation, my studies were interrupted. Only after the second World War, my studies were resumed in the United States where I had to adjust myself to the use of a language foreign to me and to work in a different cultural environment than the one in which I had grown up. Moreover, the world around me had undergone vast change and there was little resemblance between the Depression years in which I went to high school and postwar Michigan.

After obtaining my doctor's degree from the University of Michigan, my Dutch wife and I moved to Canada to settle in Saskatoon, Saskatchewan. We are still there, 31 years later. Our three children were born there and they grew up like any other Canadian in a small prairie city. My eldest daughter took an interest in the North as I did. She lives now in Yellowknife and my first granddaughter was born there. So there are now family ties between Saskatoon and the Northwest Territories.

When I started teaching geology in Saskatoon in 1950, I did my first field work in the summer along the southern edge of the Precambrian Shield. In those days, we were lucky to have fixed-wing aircraft support, but mostly we travelled by canoe and traversed rocks and muskeg by foot. Malcolm Norris, later to become one of Saskatchewan's outstanding Metis leaders, showed me how to conduct myself in the bush.

At the end of the 1950's my work took me farther north to the Fort Good Hope area and around Great Bear Lake. Subsequent years were spent in the Arctic Islands where I prospected for oil and gas deposits as a member of the exploration crews that Dr. J.C. Sproule of Calgary put out some years before the major oil companies moved into that area. Dr. Sproule is regarded as the father of Panarctic, which was set up by the Government of Canada in response to his pleas to find a way in which the interest of the smaller, independent Canadian companies could be protected.

Carrothers' Commission Showed Aspirations For Future

Because of my northern interests I was asked by the University of Saskatchewan to become the director of their Institute for Northern Studies, established in 1960. I had barely started in that position, however, when I was invited by A.W.R. Carrothers to join his advisory commission on the development of government in the Northwest Territories as their secretary and executive director. That commission, which did its work in 1965-66, had two other members, John Parker, presently Commissioner of the Northwest Territories, and Jean Beetz, now one of the nine Supreme Court of Canada justices, soon to decide on our constitutional fate. I was then and still am professor of geology at the University of Saskatchewan.

Work with the Carrothers' Commission had a great impact on my life. First, it took me to all corners of the Northwest Territories. Only, to my great regret, the Belcher Islands were missed. Second, it brought me in contact with many people living in this vast land. It opened my eyes to their daily concerns and their aspirations for the future. It thus gave me a new dimension to the practical resource exploration work for which I had been trained as a geologist.

From this expanded base grew other commitments dealing with the use of northern resources and its effects on the local populations. From 1973 to 1976 I was the executive director of the Churchill River study established by the Governments of Canada, Saskatchewan, and Manitoba, to investigate the impacts on the environment and people of a proposal to build a dam and hydro-electric power station at Wintigo in northern Saskatchewan. Again, I had a great deal to do with native people, this time mainly with members of the Peter Ballantine band.

In the meantime, when at home and in preparation of my classes in general geology, I became interested in the history of northern geological exploration. It is sometimes said that history is an old men's occupation and I am, perhaps, an example as I devote more and more time to the history of geology than to the science itself now that I am growing older.

Interest In History Of Uranium Mining

This interest in history and the North gradually led me to become involved in the history of uranium mining. In 1977 the Cluff Lake board of inquiry under

the chairmanship of Justice E.D. Bayda conducted hearings in Saskatoon on whether or not, and under what conditions, the recently discovered rich uranium bodies near Cluff Lake in northern Saskatchewan should be developed. Because my knowledge of uranium, radio-activity, mining, nuclear reactors, wastes, and so on, was limited, I decided to inform myself, and on account of my interests in history, I tackled the subject from an historical perspective. The result was an extensive article subsequently published in the "Musk-ox", a journal on the North published by the Institute for Northern Studies, University of Saskatchewan.

I have arranged that you be provided with a copy of this article. In it you will find, besides technical information, a fair amount of history on the uranium deposits at Port Radium, Great Bear Lake, which played such an important part in development of the Mackenzie River transportation system and the growth of northern aviation. I hope that you will enjoy reading this attempt at bringing history and science together.

The Bayda hearings provided the first opportunity to me to state, in public, my views on the mining of uranium. Subsequently, I submitted written statements and appeared personally before the Warman uranium refinery hearings and the Key Lake board of inquiry. Also, as a member of the Science Council of Canada, I had an opportunity to express my views on northern resource development and energy options open to Canadians by participating in deliberations leading to two of their policy reports, the one entitled "Northward Looking, a strategy and a science policy for northern development", and the other "Roads to Energy Self-reliance, the necessary national demonstrations".

Why did I take a stand on these and other occasions when admittedly my expertise is not narrowly focussed on the geology and extraction of the uranium resource? The reasons follow from what I told you about my background and experience.

Media Giving Geology And Mining A Poor Image

As a geologist and scientist, I became concerned about the poor image science, geology, and mining was getting in the media reports about the various hearings held on uranium extraction and use. Increasingly in the last few years, scientists and engineers have become depicted as less than responsible citizens, devoid of environmental or social conscience. This, as a teacher of many of those scientists and engineers, I could not let go unchallenged.

As a Canadian I became concerned that our country, through endless squabbles with concurrent inaction, would lose its place among the leading nations of the world; that Canada would contribute less and less to the welfare of all. Most of all I dreaded to see the country become divided about whether or not to proceed with the prospecting for and extraction of a particular metal -- uranium. Never before in history has there been such doubt about a resource that non-development has been advocated. That the uranium debate which now preoccupies so much of our time would harden attitudes to such an extent that any concession would be regarded as a sell-out by one party or by their opponents, saddened me most. Are Canadians in danger of losing their ability to achieve compromise through open discussion and a search for consensus? Are we that anti-science that we abandon rational thought?

Finally, as an individual I feared that my children would enjoy less of the bounty that their country has to offer. For that bounty to be harvested, we need energy. A drastic reduction in the availability of energy will have a drastic effect on our standard of living which may well be reduced to a level comparable to that prevailing in small towns and villages in the Middle Ages. The availability of chemical and electrical energy has been the main reason for the abandonment of slavery. Mankind may yet return to slavery if such energy is no longer available in sufficient quantities at an affordable price.

Nuclear Energy Is Here To Stay

What then has been my position with respect to the matter that concerns us here, the development of the uranium energy resource? Let me reiterate my statement to the Warman refinery inquiry held by EARP, the Environmental Assessment Review Panel set up for this purpose: "Nuclear energy is here and it is here to stay. As with any other natural resource it can be used but also misused. The problem then becomes one of first identifying these uses and abuses, and the characteristics of the resource on which they are based. Next we need to take measures that will reduce any risk to an acceptable level and to put these measures into laws and regulations. Lastly, persistent vigilance and enforcement of rules is required. The whole process demands extensive research and open debate, and these take time. If that time is not available and we are forced into a position of crisis management, resource utilization will become less than rational and therefore detrimental to mankind. Let us then proceed wisely with uranium development."

What is the basis for making the statement quoted above? The basis is clearly provided by an understanding of the occurrence in nature of the element uranium and by a knowledge of the history of extraction by mankind of that element from its natural occurrences.

Uranium, a metallic element, is not uncommon in rocks and soils of all kinds and of all ages, all over the world. It is more abundant than gold and widespread through the environment. It occurs in water and living organisms. The technology now exists to extract it from sea water. Any nation having the determination to obtain uranium for whatever purpose and willing to direct its scientific and monetary resources to that purpose can obtain uranium.

Uranium Has Been Studied For Many Years

Second, the element uranium has been known for close to 200 years. Through that time, its properties have been increasingly better known. Even the peculiar property of radiation has now been studied for more than 80 years. In central Europe, silver mines carrying also some uranium minerals have been operative for many centuries. Mining ore for the express purpose of extracting uranium from it has been going on in what is now Czechoslovakia ever since 1790. Although this mining, in its early days, proceeded in ignorance of the property of radiation and practices were employed which we would no longer condone, the effects this uranium mining has had on the environment and the general public have not been of the disastrous proportions sometimes believed to be inevitably associated with uranium mining.

True, the mining of uranium before safeguards against radiation exposure were implemented, affected the health of miners. The statistics available on what is now know to be radiation-induced lung cancer among miners in the 19th century Czechoslovakian uranium mines should be a reminder to all present legislators that regulations regarding workers' health are required, based on the best current scientific knowledge.

Uranium Mining Is Inevitable

Because I believe it inevitable that uranium mining will once again come to the Northwest Territories and because our knowledge about the resource and our concerns about the effects of mining have both greatly expanded since the days of Gilbert Labine on the shores of Great Bear Lake, I also believe it imperative that this Legislature address the matter of control of uranium exploration and extraction. The Legislative Assembly of the Northwest Territories is indeed to be commended for directing its attention to the matter. I am certain that both proponents and opponents of uranium development welcome this attention at this time.

At the peril of sounding like someone offering gratuitous advice, I should like to mention a few points regarding the legislative task facing you. There is no doubt that rules and regulations are required for the proper conduct of exploration for and the mining of uranium. The responsibility for jurisdiction in this respect is divided between the federal and the territorial governments. The role played by the federal government's Atomic Energy Control Board has been brought to your attention at the last session and your officials are undoubtedly familiar with all details of that role as they affect you.

With respect to legislation falling under your jurisdiction, which I understand to be concerned principally with the safeguarding of the environment, I would like to direct your attention to the latest draft of regulations by the Saskatchewan Department of the Environment, a copy of which has been submitted to the Clerk of this Legislative Assembly. I have passed this proposed legislation on as a possible model for you, not merely because I am from Saskatchewan, nor because I understand it to be carefully drafted and acceptable to both the companies and those affected by their operations, but also because the nature of the ore bodies discovered in the last 10 years or so in northern Saskatchewan is similar to the prospects now being investigated in the Northwest Territories. Moreover, we are dealing with closely comparable environments or at least more akin to each other than, say, British Columbia is to the Northwest Territories. It should be kept in mind, however, that there are differences between various types of ore bodies and their location with respect to population. Different regulations are obviously required for low-grade deposits than for high-grade ores. Also, regulations for mines near centres of populations, such as those in the southwestern United States, need to be different from those far removed from people.

Assembly Should Share Saskatchewan's Experience

I am confident, though, that using the Saskatchewan experience as a starting point, special adaptations for site-specific factors can be made. The main point is to emphasize that your work need not proceed in a vacuum. Much research that is applicable to the situation in the Northwest Territories has been done elsewhere and need not be repeated at substantial costs in money and time by increasingly scarce, competent personnel. Saskatchewan's experience is only one example, but one that needs to be closely scrutinized.

Besides legislation directly affecting the exploration and mining of uranium, thought should be given to policies respecting the maximization of the benefits and the minimization of the disbenefits from these activities. Foremost among these policies should be one to assure Northwest Territories participation in decision making and a fair sharing of revenue between the federal and territorial governments.

Such policies should be flexible enough to keep pace with development, while at the same time influencing the pace so that it not proceed at a rate detrimental to the Northwest Territories. Again, I should like to call your attention to what the Government of Saskatchewan has done in this respect, and I recommend that you instruct your officials to inform themselves by keeping in close contact with their counterparts in Regina.

CHAIRMAN (Mr. Fraser): Dr. Kupsch, you have another six pages. Maybe we should take a 15 minute break and then you can complete your presentation. Thank you.

DR. KUPSCH: Pardon me. I did not quite get that, Mr. Chairman.

CHAIRMAN (Mr. Fraser): You have another seven pages here, so we will take a 15 minute coffee break and then you can complete your presentation.

DR. KUPSCH: Thank you, sir.

---SHORT RECESS

CHAIRMAN (Mr. Pudluk): Could this committee come to order? Could you continue, Dr. Kupsch?

Moratorium Hinders Rather Than Solves Problems

DR. KUPSCH: Thank you, Mr. Chairman. It is argued by some that a moratorium on uranium development would provide time to do research and to consider the best ways and means of extracting the resource at some future time. Experience has shown otherwise. Nothing is done during a moratorium, the few qualified scientists, technicians and administrators available being employed elsewhere on more immediate problems that promise a greater return in money and practical experience.

A moratorium hinders, rather than solves, existing problems. Industry will not proceed with research into solving technical difficulties unless it is reasonably assured that ultimate development of resources will be permitted. Neither will government, either directly or indirectly, do the required research or draw up regulations for eventualities that may never arise. The danger of crisis development, with unresolved safety and other problems, then becomes a real possibility.

At hearings, inquiries and information sessions such as the present one, most witnesses present technical and scientific data on the difficulties associated with the development of uranium resources. Rarely are the advantages brought out. However, it was after careful consideration of all conceivable disadvantages as well as advantages that the Government of Saskatchewan in 1978 accepted the recommendation of the Bayda Commission that uranium mining proceed in that province. Thus, in the government's view the advantages outweighed the disadvantages.

Benefits Accruing From Mining Of Uranium

The benefits accruing from the mining of uranium to the people of Saskatchewan may be summarized as follows: (1) Direct employment in mining activity or the construction of mine plants; (2) indirect employment in, for instance, transportation; (3) entrepreneurial opportunities in the supply of goods and services to the industry; (4) increased opportunities for training and education; (5) upgrading of community services as for instance, new recreational facilities; (6) royalties and taxes on three levels of government, federal, provincial or territorial, and local.

In Saskatchewan, studies indicate that the uranium industry will add from 6500 to 11,000 permanent jobs between now and 1990. Royalties will be collected by the province from operating mine companies. These royalties will total between $1.5 and three billion dollars during the 1980's.

It is, of course, impossible to say at this time what the monetary benefit to the Northwest Territories will be from any future uranium mining. Nevertheless, it is none too early to deal with the federal government regarding future revenue sharing and to contemplate what steps need to be taken to ensure participation in development by northerners.

Major Opposition Stems From Public Concern On Safety

The major opposition to uranium development stems from public concern about safety and security of disposal sites for wastes from nuclear generators, about proliferation of nuclear weapons and associated terrorism, and the moral and ethical issues related to development and the use of nuclear energy. The Cluff Lake board of inquiry, or Bayda Commission, spent much time on these questions, since their conclusions are central to basic judgments concerning uranium mining.

It is our duty as citizens to see that uranium is mined for peaceful uses only. The metal itself is not inherently good or bad. It can be misused for warfare or used for the benefit of mankind to provide energy and as a feedstock for reactors to produce the radio-active isotopes now used in the treatment of cancers instead of radium.

Having a substantial part, 10 per cent of the world's known reserves of uranium in Saskatchewan, makes it, in the view of our present Premier, the Hon. Allan Blakeney, morally imperative that we share this wealth of energy with the rest of the world. He has stated his views on this matter several times in newspapers and elsewhere.

As with other aspects of uranium development, different opinions are voiced on the ethical considerations regarding the use of uranium. Whereas the Mennonite community opposed the building of the proposed Warman uranium refinery, based on their pacifist beliefs and the possibility that uranium may find its way into warheads, the Reverend Stahl of the Hutterite colony, across the river from the selected site, ended his testimony before the EARP panel as follows: "In closing, I would like to add that common sense tells me that we cannot stop progress. I truly believe that our Creator left this product to man millions of years ago, and that we are now at this day and age where, with our educated scientists and modern technical equipment, this product can be used safely for the good of our people and our country." With those words of the Reverend Stahl I would like to conclude my submission, and with your permission, Mr. Chairman, I would like to show a few slides that are already set up for you.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Does this House agree to see the slides?

SOME HON. MEMBERS: Agreed.

CHAIRMAN (Mr. Pudluk): Proceed, Dr. Kupsch.

DR. KUPSCH: Thank you very much.

(Slide Presentation)

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch for the slide presentation. Hello, can you hear me, there? You still have 16 to 17 minutes to complete your presentation.

DR. KUPSCH: Mr. Chairman, I will forego those concluding remarks, and I understand that at the end of the question period I will be given some time, and I will read those concluding remarks at that time, so I am open now for questions.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Now it is open for the question period. Mr. Noah.

MR. NOAH: (Translation) Thank you, Mr. Chairman. Dr. Kupsch has spoken very clearly, and we would like to thank him for coming here. I have a few questions that I would like to bring forth. I would like to ask him that if somebody were to find uranium, would he make a lot of money on this? Would he be happy if he were making this money, and would he forget his friends? Would he like his fame more and forget his relatives? That is my first question.

If this uranium is being used throughout the whole world, you do not seem to mind it if a world war was beginning here now. It seems that he thinks that he knows a little bit more than the experts that were here. He spoke clearly. I want to ask him again, for the next question, the uranium in this world in the other countries outside of Canada, even if they stopped exporting uranium, would he go ahead with uranium exploration, or if any other countries were to stop buying uranium, or if the price was to hike up?

My last question is why radon-222 or radium-226, cesium-137 and the rest -- how come he has not spoken more on these topics? Are you hiding something, or are you just trying to bring forth the good reasons for uranium exploration? These are the questions that I wanted to ask, Mr. Chairman.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Dr. Kupsch.

Profits Made In Uranium Mining

DR. KUPSCH: Mr. Chairman, I will try to answer those questions to the best of my ability. The first question I understand, Mr. Noah, dealt with profits made in uranium mining. Before we saw the slides, I forgot to mention -- it was only briefly alluded to in the tape -- that Cluff Lake mining is not a private mining company. Twenty per cent of Cluff Lake mining is owned by the Government of Saskatchewan, and 80 per cent of the mining is, in essence, owned by the Government of France. So, as a citizen of Saskatchewan, I am, in a very small way, one of those who make profit from uranium mining, and so is every other citizen in the province of Saskatchewan.

This morning, when one of the previous speakers mentioned that phrase of "filling the corporate coffers with ill-gotten gains", I took this down, because I took exception to that. I am a citizen of Saskatchewan, and I think that the people in Saskatchewan are honorable citizens. We are all shareholders in the Saskatchewan Mining Development Corporation, which is a crown corporation, and therefore we are all part owners of the uranium industry in the province.

If this would affect my social relationships with my family and so on, I do not see that it has any bearing on that. The gains that I make, and every other citizen of Saskatchewan, are so miniscule that we are not getting rich off it individually. We are getting rich off it as a province, and, with the system that we have, the democracy that we enjoy, not only in Saskatchewan but the other provinces in Canada, of course this wealth is shared, and I think the share is one that helps make life better for my children, for the relatives mentioned by Mr. Noah. I think they are benefiting from it. I am getting too old to benefit myself, but I think that my children will benefit by this wealth that is being produced for the good of all citizens of Saskatchewan.

The second question dealt with the use of uranium all over the world. That is indeed true. The ore is shipped from Cluff Lake -- let us take that as an example -- to France, obviously, if the French government has such a large interest in it. They are one of the users of that ore.

Nuclear Proliferation A Matter Of Grave Concern

The matter of nuclear proliferation, or should I say the use of nuclear weapons in warfare is condemned, I believe, by every sensible person. It is in no way to be condoned. That has never entered my mind and I think that all the witnesses that appeared before you think that that is a real disaster that could come over this world if these nuclear weapons were being used. Again, a great deal of thought was given to this in the Bayda Commission, various briefs were presented, and it is in front of me what was found by the Bayda Commission with respect to proliferation.

The board concluded that proliferation has acquired the momentum of such force that it will not be stopped or even fractionally reduced by Saskatchewan witholding her uranium from the world market. Proliferation is a matter of grave concern to people. Wars begin in the minds of man. The real answer to proliferation is to work to create the political will for disarmament. Again, the board concludes that witholding Saskatchewan uranium from world markets for nuclear power is irrelevant to the formulation of that political will for world disarmament.

Terrorism involving nuclear materials and nuclear facilities will not be prevented by withholding from the world market the uranium Saskatchewan has to offer, nor will the incidents of such terrorism be reduced even fractionally, by that withholding. I am quoting that mainly so that the honourable Member has an idea of how serious a problem this is that has been addressed by a legislative assembly similar to yours, but then, in the province of Saskatchewan, they have grappled with this problem. They asked the same question you are asking, can we afford to put this uranium on the world market if there is a possibility that some of it will be misused by people of ill-will?

Your third question dealt, as far as I understood, with the presence of radio-isotopes in the environment, in particular this cesium and some others that you have mentioned. The reason, Mr. Noah, that I did not address myself to that is not because I wanted to hide anything. The only thing that I can hide in this respect is my ignorance. I am not a nuclear physicist, and I really do not know and I cannot give you any answers that are meaningful in terms of quantities and changes that take place in the environment. It is a very difficult question you ask, and I would urge you to ask that question from several experts, and I am sorry I cannot help you with that technical expertise.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Noah.

MR. NOAH: (Translation) I would like to thank you very much for giving me a good answer. We are going to have people come in here and speak about uranium. I am sorry that you were not able to answer this particular question. The reason I was afraid was because I thought you were only bringing out the good side of uranium. I thought you were only trying to show the good side of uranium which was my understanding, but thank you very much.

CHAIRMAN (Mr. Pudluk): Mr. Noah, did you ask that question? Oh, yes, he is finished. Okay. Dennis Patterson.

Opposition In Saskatchewan

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. I do not mind saying quite frankly to Dr. Kupsch that I was very surprised that there were no hesitations or reservations or cautions, really, expressed in this very strong presentation. For example, you mentioned the Hutterite leader, but is it not true that all the major churches in Saskatchewan are opposed to uranium mining? Have the Association of Rural Municipalities not recently stated their concern about uranium mining in Saskatchewan and called for a halt? What about the Bayda recommendations that the tailings with this deadly radium-226 be stored in concrete vaults with asphalt tops?

Now, I understand, you can correct me, that this poison must be kept isolated for 16,000 years. Who is going to replace the vaults? How are the contents going to be safely transferred? Who is going to pay for this? What risks are involved? You talk about benefits to future generations, but this sounds like a burden, especially once the mine is finished and the site has been abandoned, so that there are no more profits remaining. I would like some answers to some of these questions and perhaps some recognition that the issue is not quite as clear as the witness might have led us to believe. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Kupsch.

DR. KUPSCH: As to the first question, of course, there is opposition in Saskatchewan against uranium mining, and Mr. Patterson mentioned the churches, and he has also mentioned a resolution passed by the Saskatchewan Association of Rural Municipalities. I could mention the resolutions passed by various labour unions who accepted the findings of the Bayda Commission and I can provide you with references for those. Opposition in Saskatchewan, as far as uranium

mining is concerned, is an issue that crosses party lines. As you are all probably aware of, the governing party in Saskatchewan is the New Democratic Party and within the House, within the legislation, there are critics of the policy adopted by that party in Saskatchewan.

In my own constituency, Mr. Peter Prebble is a very outspoken and nationally known opponent of uranium mining, and he is a member of the NDP party. There are opponents and proponents of uranium mining in the other two leading parties as well, but it strikes me as rather remarkable that the most outspoken opponent in the NDP party, Mr. Peter Prebble, is from a city constituency, dominated by students and in which I also happen to live. Whereas the members from the North and the present minister of the department of northern Saskatchewan and the present minister of the Department of Environment, formerly the minister for northern Saskatchewan, both are supporters of that present policy.

I find that rather remarkable, because once again what we are faced with in Saskatchewan is opposition to uranium mining coming to us from a stratum in society which is well off, which have their needs being taken care of and they forget about the needs of northerners, who still have a lot of catching up to do.

Intervention By Greenpeace

Just a few weeks ago, it was announced that Greenpeace will now make it its mission to come to Saskatchewan and stop uranium mining and therefore development of the northern part of our province. For those of you who are not familiar with that, Greenpeace are the same people who oppose the hunt of the harp seal in Newfoundland and got into altercations, to put it mildly, with the fishermen who were making their living off the harp seal in Newfoundland, and at the same time, as you probably still remember, the price of other seals in the Eastern Arctic dropped considerably. So there are several people around the table that have already had the effect of an intervention by Greenpeace. We are going to be next on their hit list, and I am afraid that the northerners in Saskatchewan will also feel the effects of that intervention.

I think this actually deals with your first question. The second question was tailings. You have heard that there are various ways in which tailings can be managed, and they depend entirely on the type of ore deposit that is available, it depends on the soils that are there, on the rocks from which the tailings have been extracted, on the extraction and milling process itself. There are a lot of variables in this, and to say that there is one good method to take care of tailings is misleading. It depends on so many different factors that I would recommend what I have said before and that is that this legislation has to get the best technical advice for a site-specific disposal or management of tailings.

Right now in Saskatchewan, our greatest problem is not with uranium tailings at all. It is with the tailings of potash mines in the southern part of the province, but nobody talks about it because there is where the people live who vote for the people to be sent to the legislature. That is the one thing that we are really concerned about right now, and those tailings, having some isotopes in them that have no half-life, they will be there forever, and I would like to make that very clear. The toxicity of sodium and so on does not deteriorate in time. They are going to be there until the whole world is finished.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Are you satisfied now, Mr. Patterson? Mr. Patterson.

Concrete Storage Vaults For Tailings Will Not Last

HON. DENNIS PATTERSON: Well, Mr. Chairman, I do not think the witness answered my specific question about the recommendation about storing radium-226 tailings in concrete, as recommended for Cluff Lake. Is it true that these concrete

vaults are only going to last for 50 or 100 years and that on that basis, they are going to have to be opened up and changed something like 200 or 300 times over the next 16,000 years? Who is going to pay for that? What is it going to cost and where is the initiative going to come from if the mine is finished and there are no more profits flowing and the site has been abandoned? Is that the kind of legacy you want to leave a future generation?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Kupsch.

DR. KUPSCH: Mr. Chairman, I visited Cluff Lake and as far as I remember, and the honourable Member may correct me on that, if and when -- I hope he will have a good look at the site itself. I think that the Government of Saskatchewan would be only too pleased to have Members of this Legislature come and see for themselves. As far as I remember, the large concrete bins for high-grade ore contain only the ore before it goes to the mill and then is processed, and then the tailings are disposed of in a tailings pond where a dam was built. There was a tailings drawing of this on the screen in the beginning of the show and I think there was some confusion about that, because it is just like a storage bin with materials being taken out and then replenished and so on and, of course, when the mine comes to an end there should not be any material being left there to stay. That would be a terrible thing to do, but again, that means that regulations have to be made on that, that dismantling of plants not be left in that condition.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Patterson.

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. I would like to question the witness further on the statement that nothing can be done during a moratorium. Perhaps not in the Northwest Territories, but are there not a lot of things to be learned in other places like Elliot Lake, the United States, and other parts of the world. There are studies going on about uranium miners. I think many witnesses believe that we do not know enough yet about the real long-term implications of mining, for miners in Elliot Lake, for example. Why not wait and benefit from this experience? Financially, would this not be advantageous in that world uranium prices might recover, making it more profitable when and if we do mine, with answers to these very profound questions?

You seem to believe that waste disposal will not be pursued during a moratorium, because it does not bring financial return. Well, I suggest that the corollary is that there is a need to find a long-term solution to the waste disposal problem, because that reasoning would apply even more after a deposit has been mined out, the site abandoned, and, by the same reasoning, no more potential profits remain. Thank you, Mr. Chairman.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Kupsch.

DR. KUPSCH: Mr. Chairman, it is a very difficult question to ask. Of course, in any scientific investigation, when is enough enough? Particularly if you, let us say, start talking about the effects of low level radiation, we may study this for thousands of years and not get the answer to it. It is very difficult to predict in science exactly when this is enough.

Legislation Should Start Now

As far as the Northwest Territories is concerned, I thought that I mentioned to you that the main thing is to get started now on legislation, negotiations with the federal government and so on, because to the best of my knowledge you do have a lead time of about eight years or so. If exploration goes along, ore bodies will have to be discovered and so on. You can ask any mining engineer and I think that is my best guess. It has to be worked out and so on. You will not have a mine overnight. Let us say it is eight years, and maybe you can ask another witness who is more familiar with the mining of uranium what the lead time is, and my plea is not to waste those eight years, but to really go to work and see what regulations are needed so that you are prepared when that day comes. You do have time available. There will not be any mines springing up overnight.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Patterson, you have about three minutes.

HON. DENNIS PATTERSON: Yes. Thank you, Mr. Chairman, and thank you for that answer. I think by all means we should take advantage of that time, but I am not yet persuaded that we might have all the answers, even in that time, and that is why I asked that question.

Just one more, Mr. Chairman, if I may. This business of nuclear energy providing our power needs as a source of energy. Now, is it not a very small proportion of our Canadian electricity supplied by nuclear power in the area of two per cent now, and how is that forecast to increase? Are we not going to end up with the same problems that we are facing with fossil fuels now, in terms of depletion of uranium? If we were to expand into nuclear power, will we not run out of uranium about the same time as we are predicted to run out of oil now, if we move ahead in that direction? Are there not safer sources of energy, hydro, hydrogen, or other sources that would pose less long-term risks? Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Kupsch.

DR. KUPSCH: Mr. Chairman, as far as predictions for the amount of electricity generated by nuclear energy is concerned, the best report on that is one prepared by the Science Council of Canada, and I believe that last time I submitted that to the Clerk of the Legislative Assembly, and if I have not done so, then I will do that. I am just thinking, you know, that I remember that this prediction was about 20 per cent of the total electrical energy needs in Canada by the year 1990, but I may be wrong in that. There is a reference in the paper that I have given to you on page 18, and there are tables that show you or give you that answer in the last report mentioned there, which is called, "Roads to Energy Self-reliance, the necessary national demonstrations".

Other Sources Of Energy Available

Of course there are other sources of energy available. You mentioned, for instance, hydrogen, but the first thing, of course, you have to ask yourself, how do you produce the hydrogen? You need electrical energy for doing that and the whole idea is to go into a hydrogen economy, as it is called, by generating electricity by, let us say, hydro-electric development, but we are fast running out of hydro-electric sites. If you talk about the disadvantages of using a particular energy source in northern regions, hydro is not all that clean. I mean, you probably know more about the whole James Bay area than I do and how that has affected the northern people in that area. The effects of a large scale hydro-electric development may be infinitely much larger than the little football field sized ore body that we have got in Cluff Lake.

Other sources, such as coal -- we are really worried about that now in southern Saskatchewan, because we have a coal deposit there near Coronach, and the amount of acids that come out of the stack seems to be affecting the land. I see this coming, too, in the Northwest Territories, once the large-scale operations of the heavy oil and tar sands in northern Alberta really get going, because you are down wind from there, and acidification of lakes, I think, is going to be a problem that is going to hit the Northwest Territories in the not too distant future.

So, we can go on and on. All these various sources do have advantages and disadvantages. What is said in the report of the Science Council of Canada is we should have a look at all of them, including, of course, conservation, but how far can you go? We can achieve quite a bit, and the Science Council of Canada and the Science Advisory Board of the Northwest Territories have directed themselves to that problem -- how much we can do as far as energy conservation is concerned, but let us say you cannot cut it down so that you really change the lifestyle of people. It is a very, very difficult question,

Mr. Patterson, that you are asking, but quite a number of serious studies have been made in this respect and the Science Council of Canada report will give you a good starting point on the broader issue of energy sources.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. We are going to break for dinner and we will come back at 7:00. We will still have 26 minutes to go for the question period when we come back. We are going to have a recess until 7:00 o'clock.

---DINNER RECESS

CHAIRMAN (Mr. Pudluk): The Chair recognizes a quorum. The next speaker is Mr. MacQuarrie. I just want to remind you, there are 26 minutes left. Thank you.

MR. MacQUARRIE: Thank you, Mr. Chairman. I will get organized here. Yes, the Cluff Lake inquiry at one point stated that development in the northern region would be pointless unless the people in the northern part of the province benefited from it. I see from the slides -- which I would understand is a government promotion -- that there are benefits for northern peoples. Would you tell me, in your own judgment, whether you feel they are adequate? Can you cite any evidence which indicates that the people in the northern part of the province think they are adequate? Finally, if you do believe they are adequate, how did the Government of Saskatchewan go about ensuring that people in the northern region would benefit adequately from that development?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Dr. Kupsch.

DR. KUPSCH: After the Cluff Lake inquiry submitted its report, there was a response by the Government of Saskatchewan to the report, and there was one aspect, at the time, that I found rather disappointing, and that was the reaction of the Government of Saskatchewan with respect to a brief that we had presented to the board, and which was accepted by the board, and ended up in the report. In essence what it said is that, because the people in the North, where the uranium deposits happen to be, are going to be most affected and carry most of the disadvantages, we recommend that a special board be set up to look after development of the North, taking funding coming from the uranium development.

CHAIRMAN (Mr. Pudluk): Dr. Kupsch, I think you are speaking too close to the mike. Could you move back? That looks better from here. Thank you.

DR. KUPSCH: That was not accepted by the government, because the government reasoned that, at present, the amount of moneys that flow from the southern part of the province into the North are greater than any revenues that the North would get from uranium mining, and I am certain, Mr. MacQuarrie, that you are familiar with that argument, because it is the same argument that Ottawa uses with respect to Yellowknife.

I am happy to report, though, that the Government of Saskatchewan has had a change of heart, and that they will now consider a development board in the North which would take a fair proportion of the revenues from uranium mining, so they have turned around, and I hope that the government in Ottawa also sees the light with respect to the Northwest Territories.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Curley.

Proper Use Of Uranium

MR. CURLEY: Thank you, Mr. Chairman. I guess, Dr. Kupsch, you know, you stated that uranium can be used -- which probably means that it could be used to proper purposes -- and it could also be misused. Could you tell me, from your view, as to what you mean? What would you consider misuse of nuclear energy and for what purposes? What are the purposes which would be proper use of nuclear energy?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Curley. Dr. Kupsch.

DR. KUPSCH: That statement did not refer to nuclear energy, it referred to uranium. Of course, there is only one significant use of uranium which is beneficial to mankind, which is using it for the generation of electrical energy, and there is only one disastrous misuse of uranium, and that is in warheads. So that was what I was referring to; the two uses of uranium, just like you can have two uses of other elements. They can be used and misused, and in my feeling the misuse, of course, is for war materials.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Curley.

Regulations For Uranium Mining In Saskatchewan

MR. CURLEY: Thank you, Mr. Chairman. I wanted to ask you, also, since your presentation seemed to revolve around the experience of Saskatchewan, could you tell me what kind of a regulatory role the Saskatchewan government has with respect to uranium mining, whether or not their enforcements of any sort are successful or not? You know, I really am not sure as to what kind of enforcement they do have in running the mining in Saskatchewan.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Curley. Dr. Kupsch.

DR. KUPSCH: The regulations that Saskatchewan has are and have to be, by law, more stringent, or equal or more stringent, than regulations that are drawn up by the Government of Canada. In the matter of environmental protection, I have already mentioned during my talk that I submitted to the Clerk of this House a fifth draft of regulations for the Department of Environment in connection with uranium mining, and I think that is a good model to at least have a look at and study it and see in how far it is applicable to the situation in the Northwest Territories.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Mr. Curley.

MR. CURLEY: Yes. My last question is: Could you tell me, Dr. Kupsch, who owns those uranium mines in northern Saskatchewan, and what percentage do the companies own, from your knowledge, in that part of northern Saskatchewan?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Curley. Dr. Kupsch.

DR. KUPSCH: I did not quite understand the question. Does it deal with the proportion owned of the uranium mines by private enterprise and by the Government of Saskatchewan? I really do not know. I would have to ask some other people that are more knowledgeable about it, but the Saskatchewan Mining Development Corporation, which is a crown corporation of the province of Saskatchewan, does have agreements with private operators for sharing. They have agreements for prospecting, agreements for other work and so on, and then with mining. With Key Lake, the province of Saskatchewan, if that ever comes off the ground, will be the majority stockholder in the Key Lake operation. In Cluff Lake, of which you saw the slides, the Government of Saskatchewan owns 20 per cent only, but in the newer ones, they are going to have a higher percentage, and in Key Lake it is more than 50 per cent.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Kupsch. Any more questions? If there are not, you can make your closing remarks now, Dr. Kupsch.

Dr. Kupsch's Closing Remarks

DR. KUPSCH: As I mentioned to you before, I do have some written conclusions with the paper that I gave before, and I would like to read those to you now.

When the present supplies of fossil fuels are exhausted, we shall have no alternative energy supply capable of compensating for the loss of oil and gas. This fact compels one to conclude that nuclear development should be allowed to proceed. The public has to confront this inevitable choice. Either electrical energy must be manufactured from fissionable materials as well as from other sources, or we must face the consequences of a "life-altering world energy shortage". Exaggerated fears of reactor malfunctions, environmental degradation and health hazards must be overcome in the public mind so that those energies which have been devoted to delaying or halting the mining of uranium can be channelled productively into "a steady expansion of nuclear generating capacity,

consistent with safety, environmental security standards, and with the need to prevent the proliferation of nuclear weapons". In short, the nature of the energy crisis and the reluctance of the general public to come to grips with the problem so as to alter patterns of consumption make continuing, well-regulated expansion of the industry necessary if our present mode of living is to be preserved.

Efforts by the federal government to persuade the Canadian public of the consequences of permitting consumption to continue at present rates have so far been unsuccessful. The lifestyle we presently enjoy will be drastically altered if we are forced to adopt conservation measures so stringent that they may well curtail traditional civil liberties.

On the basis of the foregoing, the development of nuclear resources is of utmost importance. However, the mining of uranium must be combined with research programs aimed at determining health hazards of radiation, improved tailings disposal, breeder technology, processing of spent fuels, and the safe and permanent storage of radio-active wastes. Sensible conservation measures ought to be encouraged in the public, and environmental protection must continue to be a vital concern of both individuals and government.

I would like to add to that a little postscript: I enjoyed appearing before you, and giving you my version of the Saskatchewan experience. The Saskatchewan experience, with which I was closely involved, and which I believe I do have some knowledge of. Some of the other witnesses made what appeared to me rather disparaging remarks about those who sit in a different legislature than this one, those who sit in Regina for the Saskatchewan legislature. Remarks were made that those MLA's really lacked in common sense, that they were, one way or another, less moral than others, and that they were not totally responsible. I regret very much that those remarks were made, even though they did not come from any of the legislators, but they were made in this House about another one.

This has nothing to do with political leanings. The Government of Saskatchewan is the government of the NDP, like I mentioned before, and if you are interested in my political leanings, you can look it up in "Who's Who, in Canada", but I do not belong to the party. Nevertheless, I am one of the people who elects our MLA's, and I, for one, know that they have grappled with this issue, that they have come to an honest decision, and this decision was to proceed. It would not occur in my mind to cast any doubts on the way they proceeded. They have really given it a great deal of thought, and came to that particular conclusion.

You have heard much technical expertise, you have heard something about legislation, but you heard little or nothing about the political consequences of any decision you are going to make, and to come back to Saskatchewan, I can only tell you that the northern members of the legislature of Saskatchewan gave a great deal of thought about what would happen when they would go back to their constituents and had to face these constituents after they had made a decision which would affect the future of those constituents, particularly the young people, by taking away opportunities for bettering life in the North, and I hope that that is the main consideration that you will have in mind. How you are going to proceed, I do not know. What your decision is going to be, I do not know, but I hope that you, like the people in Saskatchewan, will have the interests of your part of the country at heart. Thank you very much.

---Applause

CHAIRMAN (Mr. Pudluk): Thank you very much, Dr. Walter Kupsch, for appearing before this House. Now the next, Dr. Gordon Edwards. Does this House wish to invite Dr. Edwards?

SOME HON. MEMBERS: Agreed.

CHAIRMAN (MR. PUDLUK): All right. I would like to welcome you, Dr. Edwards, and I am going to give you only 30 minutes for your opening remarks and 30 minutes question period. Proceed now.

Presentation By Dr. Edwards

DR. EDWARDS: Thank you very much, Mr. Chairman. I am very happy to be back again and to have this opportunity to summarize from my perspective the debate that has proceeded so far. I would like to begin by calling your attention to a number of documents which I have had distributed to the Members of the Legislature, and to which I will be referring to as I go through my presentation.

First of all, you will notice from my curriculum vitae, which I have distributed to you, that I am certainly very much in favour of science. I have a scientific training. I am very enthusiastic about the prospects for using science to improve the human condition. I do not believe that the debate over nuclear power has anything to do with whether you are for science or anti-science. I think it has more to do with a certain perspective that was brought out in Yellowknife back in February by Mr. Atherley, who said that science is for sale. That, gentlemen, is true. On page 884 of the transcripts for Friday, February 27th, Mr. Atherley said, "Whatever conclusions you or any other group of persons may want to achieve, I am sorry to say, could be bought. Science is for sale."

And on the next page, page 885, "It is my personal anxiety about science that science will not answer the questions of the decision makers unless they are pushed to do so. Instead they answer their own questions. The scientists are an important pressure group with vested interests in uncertainty. I think they make their subject matter difficult for ordinary people to comprehend."

Earlier on that same page, Mr. Atherley referred to "...scientists with a vested interest in the creation of uncertainty...." Now, this is a fact of life. There are billions and billions of dollars invested in the nuclear industry. There are billions of dollars invested in the uranium industry, and people who work for these industries are under a great deal of pressure because the industry, ladies and gentlemen of the Legislature, the nuclear industry is not in good shape. World-wide nuclear prospects are dim.

I refer you to another presentation which I have made, or another document which I have given you copies of, which is called "Nuclear Risks: Unnecessary and Uncontrollable", consisting of remarks which I made to the Canadian Bar Association in Saskatoon, about one week after my last appearance here. In that document I point out that it is not for no reason that uranium prices have dropped from $44 a pound to $25 a pound, and are still going down. It is not for no reason that nuclear power programs in many countries are at a standstill, a virtual standstill, including the United States and Canada. It is not for nothing that Prime Minister Trudeau recently announced that unless Atomic Energy of Canada Limited can succeed in selling more nuclear reactors they should get out of the business. The result is that there is great pressure on the industry to perform and one of the obstacles is the criticisms that they have come up against as regards the effects of radiation, and as regards the problems of waste disposal.

I have here a pamphlet which I could make available for reproduction -- I do not actually own it, I saw somebody reading it in the audience here. It was published in February, 1981, by Atomic Energy of Canada Limited, and it is entitled "Radiation is Part of Your Life". The gist of this document is that radiation is something you should become familiar with. It is something you should get used to. It is something you should not be afraid of, because if nuclear power is going to become part of our way of life, it is going to become unavoidable.

Nuclear Power Not A Money-Making Business

Now, Atomic Energy of Canada Limited is not involved in uranium mining, but they are involved in the nuclear industry, and that nuclear industry is doing so poorly financially that in the House of Commons it was recently announced, just about two months ago, that over $800 million of outstanding debt was going to be forgiven to Atomic Energy of Canada Limited because they had no prospects of paying it back. Atomic Energy of Canada Limited has been acknowledged by the previous energy minister, Alastair Gillespie, as being technically bankrupt. Nevertheless, it continues to receive lavish funding from the Liberal government treasury, because there is so much money invested in this industry that the government does not feel that it can afford at this moment to stop promoting it. It has not been a money-maker.

Now, in this document, I think it is quite revealing to look at the glossiness of the paper. It is the highest quality paper you can imagine, it is very expensive. The fact of the matter is that millions and millions of dollars are being spent by federal taxpayers, money to promote nuclear power and to assure people that the problems are not worth worrying about, and virtually nothing is being spent by the federal government to warn people about the possible dangers. It is an enormous imbalance.

When you actually look at the pamphlet you find such interesting pieces of information that sleeping beside another person can add to our yearly radiation dose because each person's body is naturally radio-active. If that were all that were wrong with this pamphlet it would be bad enough, but in fact it is erroneous; it is factually wrong, and I will substantiate this in a few moments. It says on page 18: "The latest reviews of scientific evidence conducted by the BEIR commission..." that is the Biological Effects of Ionizing Radiation, "...concluded that the linear hypothesis..." this is the method by which they estimate cancer effects in Canada, "...overestimates the effects of low-dose levels of radiation."

This is untrue as I will establish in a minute. I think it is important to realize that the nuclear industry is not in a healthy state. I think it is also important to realize that it takes a great deal of courage for a scientist who has spent his entire career in nuclear power to admit that perhaps his whole life has been devoted to a technology which is a dead-end technology, and, therefore, it becomes very difficult for scientists who have worked in the nuclear industry to admit that there could possibly be problems so serious as to make the further expansion of the industry undesirable.

The Peaceful Atom Goes To War

There are such people around. I refer you to this little pamphlet which I gave each of you a copy of, called "The Peaceful Atom Goes to War". Among the men who are quoted in this pamphlet, all of them were key actors in developing the nuclear weapons program in the United States of America. One of them, Dr. George Kistiakowsky, was the key science adviser to President Eisenhower, as well as a key adviser to Presidents Kennedy and Johnson.

If you read this little pamphlet, you will see that all of these men are now convinced that the spread of peaceful nuclear power is one of the great dangers in the world today. I quote from page three , "...these weapons will soon fall into many hands in many corners of the world -- into the hands of unstable national governments, aggressive military cliques, or irresponsible terrorist groups...this danger is the direct result of the uncontrolled growth of the nuclear power industry which is making widely available the materials needed for such weapons."

Now, Dr. Kistiakowsky is quoted on page four. He says: "I personally must confess that for a long time I saw myself as a technician there to put into effect the policies of government leaders -- policies which I thought had been arrived at by men better qualified to judge than myself...I gradually came to believe that some policies in this area were wrong and that one could not change them by working from the inside. I now find myself like my friends here out of the government...we have decided to speak out."

It takes a great deal of courage, ladies and gentlemen, for a man of Dr. Kistiakowsky's stature to reverse himself and say that most of his efforts during most of his professional career were perhaps wrongly directed. This problem in Canada is compounded by the fact that there are few avenues of alternative employment for people who are engaged in the nuclear industry if they wish to seek careers elsewhere. Basically, if someone in the nuclear industry wants to quit the nuclear industry, there are no other employment opportunities which would not involve a complete retraining.

Misrepresentations To Assembly Re Health Effects Of Low Level Radiation

Now, let me turn to what I think are some very disturbing misrepresentations that have been made to this Assembly about the health effects of low level radiation, and I am going to be referring to a number of documents here. I believe that you have been deliberately misled into thinking that the current permissible levels of radon gas exposure pose inconsequential health effects. This is very far from the truth.

First of all, I would like to refer to the United Steelworkers of America. This is a document which could be made available -- it is quite a substantial one. I am giving a copy to Mr. Dennis Patterson, and he could make it available to anyone else in the Assembly who wishes to look at it. It is the official submission of the United Steelworkers of America to the Bates Commission in British Columbia, and for those of you who may not realize this, the United Steelworkers of America represents the uranium miners in Elliot Lake.

In the opening remarks called paragraph one, it says: "The operations at Elliot Lake have been directly linked with causing death and incapacities of workers and considerable destruction of the surrounding environment. Although improvements have been made, the foregoing statement remains true today as it did many years ago."

A little later on, in paragraph two, it quotes from an official document that was passed at the annual convention of the United Steelworkers of America in 1979, and it says: "The pursuit of nuclear power has already cost an unacceptable price in terms of the health and lives of our uranium miners. Ontario's over-expansion of nuclear-generating capacity is a senseless waste of the taxpayers' dollars. A bad situation should not be made worse, therefore, the proposal of increased reactor construction for the purpose of exporting energy to the United States should be completely rejected. All the economic and environmental burdens would be borne by Canadians and the benefits would be few."

On page 16 of this document, it points out that lung cancer is not the only problem associated with radiation and dust in uranium mines and says on page 16: "Up to March 14th, 1975, 446 present or former Elliot Lake mine and surface workers were identified as having lung disabilities..." not lung cancer, "...in whole or in part as the direct result of dust exposure in the uranium industry. These lung disabilities are in addition to the cancers and other illnesses and to addition subsequent to the above date."

Now, Members of the Legislature, I would like to remind you that the steelworkers have nothing to lose in terms of jobs and growth of their particular union by endorsing the expansion of the nuclear industry. Using conventional

reasoning, it would seem that they would be one of the most ardent supporters of nuclear expansion and of the addition of new uranium mines, but on the contrary, they have found the health effects, even today, as being far too severe to justify whatever benefits might accrue to their union.

Permissable Levels Of Radiation

Let me turn to expert testimony, because after all, these people in the union are not experts. I am going to refer to not only the British Columbia Medical Association brief, which has already been referred to, and I have given to you a book review which I have written, which I would urge you to look at, because I realize that most of you will not have the time to read such a large document. What I have done in this book review is to try and single out a few key facts that are reported in the BCMA document so that they would be easier to read. I would call your attention to a remark on page 273 of the British Columbia Medical Association document, which says that: "Current permissible levels of radiation exposure for members of the general public is tantamount to allowing an industrially induced epidemic of cancer."

Those are very strong words coming from the medical profession, which is not particularly renowned for taking up crusades that do not have directly to do with the status and the advancement of the medical profession itself. I wonder why they would make such statements. I do not actually wonder why. I have the document and I know why. The reason they make sure statements is because after careful study of the existing evidence they have found overwhelming evidence that the present standards are completely unacceptable, and that the authorities in the Atomic Energy Control Board and in the other agencies like the International Commission on Radiological Protection have consistently misrepresented and minimized and in some cases ignored this data.

To be more specific, you have heard many of the previous witnesses refer to these bodies, like the International Commission on Radiological Protection and the National Academy of Sciences. I have here the 1980 report of the National Academy of Sciences on the Biological Effects of Ionizing Radiation. Let me tell you a few of the things which are in this document. Now, we have to use a few numbers here. You have heard many times that the present permissible exposure is four units, that is, four working level months of radon gas for uranium miners. There is a separate unit for radon gas as opposed to other types of radiation. Previously, when you heard of 5000 units, that is a different type of radiation. It is called gamma radiation. The four units that I am referring to are what are called alpha radiation, and this is what radon gas delivers to the lungs. Four units per year over a 30 year working lifetime, this could lead to 120 units.

On page 321 of this document there is an entire section dealing with lung cancer, and it reviews all of the Canadian evidence. On page 321, it talks about the Elliot Lake miners and it says that: "The crude doubling dose for lung cancer appears to be about 12 units." Now, what this means is that 12 units of radon accumulated over a period of years will approximately double the normal amount of lung cancer, which is about 54 cases of lung cancer per 1000 individuals. In other words, if you take 1000 people in Ontario, 54 of them would be expected to die of lung cancer; 12 units of exposure would double that incidence of lung cancer. The Atomic Energy Control Board says it is okay for workers to achieve anything up to 120 units.

Lowest Exposure Category

On the next page, page 322, it talks about the very lowest exposure category. Now, this requires some explanation. When they study miners, they divide them into levels of radiation exposure. These workers received very little radiation. These workers received a little more. The next group of workers received still

more, and so on, until you get into the highest exposure categories. What they found at Elliot Lake is that in every exposure category, down to the lowest exposure category, there was an excess, an increase in lung cancer above what would be expected, and that as you go up the scale of exposure, the increase is more and more exaggerated.

Now, it does not mean that everyone dies of lung cancer. The people who do not get lung cancer feel fine. They are healthy. They say, "I am okay. It cannot be harmful", but when you look at the population of men, you find that this is not true, that the men are dying far in excess of anything that would be considered normal, and this is true for both smokers and for non-smokers.

On page 322 it says, dealing with the lowest exposure category at Elliot Lake: "The doubling dose for this low dose group would be 17 working level months." On the next page, page 323, it talks about another Canadian population of Newfoundland miners, who were not uranium miners. They were fluorspar, but they also were exposed to radon gas and it says: "A doubling dose of 12.5 units...."

Members of the Legislature, I wish to call to your attention the fact that this is in very sharp contradiction to the general reassurances you have heard, that uranium miners are exposed to extremely low doses of radiation. At a permissible exposure level of four units per year, it only takes three years to accumulate 12 units, and according to this document that may well double the normal incidence of cancer. This is not, by many people's considerations, this is not a safe level.

Exposure To Levels Of Radon Gas In Your Own Home

Well, of course, as it has been pointed out, mining is a hazardous occupation. What about members of the public? Members of the public in Elliot Lake and in Port Hope and in Uranium City and in many other communities in Canada are exposed to levels of radon gas in their own homes which are much greater than the average, the normal, that one finds in a room such as this.

I have given to each of you a copy of a letter which I wrote to a Member of Parliament called Maurice Foster, warning -- now, Maurice Foster happens to be the Member of Parliament for the Elliot Lake area. I have pointed out to him that just by living in these homes for 20 years, these people would accumulate 10 to 14 units of radon gas in their lungs. If the evidence in this international report published in 1980 is correct, the people living in these homes are subject to a considerable risk of lung cancer. I tried to call attention to this fact back in 1978, long before the BEIR report was published, and I will leave with the Clerk a copy of this report which I wrote in 1978, entitled, "Estimating Lung Cancers", which deals explicitly with the problem of radon gas in Elliot Lake homes and points out that at the exposure levels which are considered acceptable by the Atomic Energy Control Board, you could expect about 17 extra cancer deaths per 1000 people living in these homes. That is 17 extra cancer deaths above the 54 per 1000 that is considered normal.

Now that the BEIR report is published, I find that my estimate of 17 is actually low, because the BEIR report would indicate that it could be, perhaps, more than a doubling of lung cancer, which would mean an extra 54 lung cancer deaths per 1000, just by people living in these homes.

Now, Members of the Assembly, this is a very crucial point, I believe. You have to judge for yourselves whether you have or have not been given the impression that these levels of radiation are relatively harmless and nothing to be worried about. You have to judge for yourself whether 54 extra lung cancer deaths per 1000 would be considered reasonably acceptable or safe for people simply living in homes that are contaminated with radon gas. You have to decide for yourself

whether the figures quoted in this report, published in 1980 by the National Academy of Sciences, which is, I might add, considered to be the most prestigious body in the United States of America to deal with low level radiation, and it has been cited by the previous witnesses. It has been cited by Dr. Myers. It has been cited by the man from the mining association. You have to decide who is telling you the truth, because obviously there is an irreconcilable conflict in what I am telling you now and what I believe you have been led to believe by other witnesses.

Gentlemen and ladies, I propose a test for you and the test is this; my understanding is that the Atomic Energy Control Board has hired independent scientists to look into this very question; the question of, what are the biological effects of low level alpha radiation, particularly radon gas. This study is not yet completed, but it is being conducted at the present time and the results are expected to be finished within two or three months. This is an opportunity for you to test and see who is closer to the truth, myself or the other witnesses who have appeared before you. I urge that you challenge the Atomic Energy Control Board to send you a copy of this report of independent scientists as soon as that report is available, and read the conclusions of that report as to what the health risks are from low levels of radon gas, and then decide whether those levels are acceptable in view of what I have just told you. My time is finished. Thank you, Mr. Chairman.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Edwards. Now we are going to have a question period for 30 minutes. Mr. Stewart.

Presence Of Radon Gas

HON. DON STEWART: Yes, Mr. Chairman. I have several questions of the witness. First, I would like to ask, is radon gas present in all uranium mines and is radon gas also present in all tailings that are the result of mining uranium?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Stewart. Dr. Edwards.

DR. EDWARDS: The answer to the question is yes. Radon gas is present at high concentrations in uranium mines, and radon gas is given off in very large quantities from uranium tailings piles. This document here, which is a two-volume document published in 1979 by the United States Nuclear Regulatory Commission, predicts that the radon gas given off by tailings piles in the United States of America in the year 2000, looking ahead a few decades -- that the radon gas given off in one year from the tailings piles in the United States of America in the one year, 2000, could be expected to produce as many as 9800 lung cancer deaths above normal, in very distant populations, over a very extended period of time. Most of those extra lung cancer deaths would appear many, many years after the release actually took place. This is the finding of the United States Nuclear Regulatory Commission and it is quite true, Mr. Stewart, that radon gas is present in exceptionally high levels in both those environments.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Edwards. Mr. Stewart.

Uranium Mining At Port Radium

HON. DON STEWART: Thank you. I possibly may be one of the few people sitting in this Legislature that worked in a uranium mine for two and a half years and probably few of the witnesses that have appeared before this Assembly have been in such a position. I am very concerned in that so many of the tactics being used, and I would say in part scare tactics, have not been proven out to my satisfaction on my knowledge of an actual operation. I was in Port Radium, Great Bear Lake, in late 1941, 1942 and 1943. I think at that time Port Radium was producing the highest concentrate pitchblende that had been found at that particular time. Now, that may be subject to correction, but that was my understanding.

There were no protective devices of any kind in the mining of uranium at that particular stage of development. They used to pack the high-grade ore in small sacks about the size of a 10 pound sugar sack, in a burlap bag that used to weigh about 125 to 130 pounds. We, the people that lived there at the time, used to use the piles of concentrate ore to sunbathe on, and we did it for a period of two years that I was there, and some of my friends were there as long as 15 years. Now, this, I would suggest, was probably as high a concentrate ore as you are liable to find. Now, we did not do it as a matter of an hour or two, but we spent a great deal of time. The pitchblende itself would absorb the heat, and they were piled in such a manner that they got you out of the wind, so this was kind of a sundeck, and that is where we sunned ourselves.

The tailings pile at Great Bear Lake -- I am going by memory now, and again I am subject to direction, but somewhere in 1935 or 1936, that mine had been started -- the water supply for the camp was drawn from within a thousand yards of the tailings pile. The fish that we ate and served in the camp dining room was caught with gill nets within two or three hundred yards of the same tailings pile. For the first year of the operation, the only meat we basically had was caribou, and the caribou had been shot within five or six miles of the camp by a local hunter.

Within the mill, dealing with these high-grade ores, there was no protection of any kind, and I am still acquainted with at least 20 to 25 people that were employees of the mine. There have been two deaths that I know of, that were caused by silicosis, which is a miner's disease that will be found in any hard-rock type of mining, and certainly not related in any way, shape or form, in my opinion, to the uranium mine. You can get it in a gold mine. These people were, by profession, hard-rock miners. I do not know of anybody that suffered leukemia or that died of lung cancer.

I am not saying that these are statistics because they are not. They are personal experience. I do not know whether you are old enough to have ever heard the old radio program that used to be on with Baron Manchousen and Charlie. Baron Manchousen was a Major Hoople type, and Charlie was a straight man, but he had a great expression: Whenever he got into any trouble, he would always say, "Was you 'dere, Charlie?" It is awfully difficult for me to understand and accept the real terror that some of the witnesses have been trying to indicate.

Now, I am not saying there is no danger; there quite well could be. I do not know. All I know is what I saw and where I worked and the people that I know that worked there. Now, these people -- I was the youngest man in the camp in 1942 -- a lot of them now are in their 70's and 80's. I cannot understand why, if these things are so dangerous, and the problems are so great, why somebody has not undertaken a study of the health and the lives of the people that worked in that mine, because that was the first uranium mine in Canada, and it started back, roughly, in 1935 -- that might be open to correction, there, by a year or two, but anyway, roughly 1935 -- because these people now are reaching the end of their normal life cycle. It seems to me that if we have statistics on what really happened to these people, then we would have a concrete method of coming to some judgment.

It seems to me that possibly in the United States, where a lot of the testing has been done, that a lot of the problems that result -- indicate cancer can be caused by a combination of radiation and radon gas, plus another mixture of something that may be prevalent in that area. I do not know, but every time you add one thing onto another, you increase the relative dangers of -- in health and everything else.

HON. DENNIS PATTERSON: What is your question?

HON. ARNOLD McCALLUM: Slow down, slow down.

MR. CURLEY: Hear, hear!

HON. DON STEWART: First question: Do you have any relative reports on Port Radium? This is the first time I have spoken in the uranium debate, most other speakers have made their points and been allowed to explain their position or...

MR. CURLEY: Go into the witness stand.

HON. DON STEWART: ...I do not think I have unjustly taken the floor at any time.

CHAIRMAN (Mr. Pudluk): Order, please. Proceed.

HON. DON STEWART: The question is, are there any statistics on Great Bear Lake, on Eldorado mining and smelting, that you know of, and, if there are, what are the results?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Stewart. Dr. Edwards.

Studies Must Be Done

DR. EDWARDS: Mr. Stewart, I think your point is excellent, and very well taken. The fact of the matter is that you do not find radiation effects unless you look for them. Studies must be done. Otherwise, you are simply putting your head in the sand like an ostrich and pretending that, because you cannot see the problem, that the problem does not exist.

I would recommend that you read the section on lung cancer in this book, and I can make a copy for you. Their conclusions are based on studies conducted over many years in many countries, the United States, Sweden, Czechoslovakia, Canada, as well as the countries like South Africa and so on. It turns out that, in Canada, the authorities have never volunteered to do such a study unless forced to do so by public pressure. It was not until 1975, in Ontario, when the Ontario government appointed a royal commission on the health and safety of workers in mines, not until then was there any effort made to look at the exact statistics for the Elliot Lake workers, and the results were not encouraging. They found that already in this population there have been twice as many deaths as would normally be expected, despite the fact that all but five of these people -- I am talking about 81 deaths, in case you are interested -- 81 deaths where approximately 40 would have been anticipated, and of those 81 people who died, only five had received more than 120 units of radiation, which is considered acceptable. Almost all of them had received less than 100 units, and many of them had received less than 30 units, yet even those who received less than 30 units showed a significant excess in their lung cancer incidence.

Now, another interesting point about these studies, Mr. Stewart, is that there is a general agreement in the results that are obtained in Sweden, Czechoslovakia, and Canada -- both the Elliot Lake workers and the Newfoundland workers. The numbers come out to be roughly the same, and this lends a high degree of credibility that it is not based upon local, individual factors, but it is based upon specifically the exposure to radon gas which they had in the mines.

In the case of Port Radium, there have been no studies done, to my knowledge, and I think it would be a very good initiative for this Assembly, perhaps, or for some authority in the Northwest Territories, to request that such a study be done. So far, the epidemiological studies of health that have been done have shown that the actual measured health effects at low doses is much greater than what the regulatory authorities had previously said, and still say, would be the case.

Once again, I might remind Mr. Stewart that during my testimony I pointed out that those people who do not get lung cancer in a sense get off scot-free. They do not feel any the worse for their experience, necessarily. As you say, they could have silicosis, or dust problems, in the lung, but generally speaking, in the case of lung cancer, either you get it or you do not. If you get it, you are a dead man.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Edwards. Mr. Patterson.

Reliability Of The International Committee On Radiological Protection

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. I would like to ask Dr. Edwards to give his opinion of the reliability of the International Committee on Radiological Protection which Mr. MacQuarrie has referred to, and, as well, the Science Council report that Dr. Kupsch says is useful and reliable.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Edwards.

DR. EDWARDS: Thank you, Mr. Chairman. I actually met, and spent two weeks, with the chairman of the International Commission on Radiological Protection two years ago. His name is Bo Lindell, from Sweden. There has been, in about the last five years, a great deal of disillusionment with the International Commission on Radiological Protection, which in the early years did some very excellent work in establishing some of the basic information that we now have at our disposal on the effects of radiation and how radio-active substances distribute themselves in the body when they are taken into the body in the form of food or drink, or in breathing.

Unfortunately, in recent years the ICRP has increasingly become a lobby group for the industry, and, despite the fact that the ICRP has repeatedly in its publications said that all radiation exposure should be kept as low as reasonably achievable, and that no unnecessary exposure to radiation should be allowed unless there is a positive benefit to be gained -- despite these repeated assurances, the International Commission on Radiological Protection is now recommending that all permissible radiation levels for internal organs of the body be increased so that members of the public can be legally exposed to more radiation than was the case two or three or four years ago.

They are also recommending that the permissible level of radium in drinking water be increased, that the standard be relaxed. Once again, the BEIR report that I have cited earlier points out that both animal experiments and human studies have shown that when radium is administered in small doses, spread out over a longer period of time, that you actually get more bone cancer than you would have if you got the dose all at once. It is a dangerous substance.

Because of this, a number of other bodies have become very critical of the ICRP, not the least of which is the British Columbia Medical Association, whose chapter 21 is entitled "The ICRP: Protector of Radiation". In that chapter they point out that the scientists on the ICRP are almost all devoted to profit-making enterprises of one sort or another which rely exclusively on the use of radio-isotopes, the implication being that to have too stringent standards would make life very difficult for the people on the committee. Whether this is the case or not, it is certainly true that the ICRP has taken a more relaxed attitude in recent years, in the last two years to be explicit, as to how much radiation people should be allowed to be exposed to.

With regard to the second question of Mr. Patterson, the Science Council report: As you will notice from my curriculum vitae, I have had some association with the Science Council. I was the assistant director of a nation-wide study of the mathematical sciences for the Science Council, and I have been a scientific consultant to the Science Council on many occasions.

Reliability Of Science Council Report

The report which Dr. Kupsch is referring to was one of the most controversial reports ever published by the Science Council of Canada because one of the men who was on the committee that approved the report is Mr. Peter Middleton, from Toronto. He felt so strongly about that report that he went to the press and this is true of no other Science Council report that I know of. I have never heard of such a scandal, but Peter Middleton in this case, a member of the committee who authored the report, went to the press and said that the sections of that report on nuclear power were essentially authored by Atomic Energy of Canada Limited, and did not constitute independent advice to the government at all. He felt so strongly about it that he felt that the public should know that the sections on nuclear power did not originate within the Science Council of Canada, but were, in fact, transferred, you might say, from Atomic Energy of Canada Limited.

I might also mention that although Dr. Kupsch did not point this out, the recommendation in the Science Council report, dealing with nuclear energy dealt almost exclusively with the problem of replacing uranium as a nuclear fuel, because uranium is expected to give out within the foreseeable future, and that therefore it is necessary to move as quickly as possible into using not uranium, but plutonium as a fuel for nuclear reactors. That was, as I understand it, the main thrust of the nuclear section of that particular report.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Edwards. Mr. MacQuarrie.

MR. MacQUARRIE: Thank you, Mr. Chairman. Dr. Edwards, you, in citing the little brochure that was put out by Atomic Energy of Canada Limited, you pointed to a statement about the linear hypothesis, and said that that was misleading, but "deliberately misleading" were the words that you used. I would simply like to say that not everything that is written is deliberately misleading, and I would have to conclude that that may be the case where, in your curriculum vitae, under consulting work, you have, as your final entry, "Legislative Assembly of the Northwest Territories 1981". I am sure that you do not intend to mislead by putting it there, but I think it would more accurately reflect the relationship between yourself and the Assembly if it appeared under "testimony" or "witnessing".

My point is simply that people in presentations are not able to say everything at once, and so sometimes there are gaps and I think it is not fair, necessarily, to level the allegation of "deliberately misleading". You have challenged the integrity of certain witnesses, sort of a blanket, not an allegation, but an intimation that science is for sale, whatever conclusions you want can be bought, and left Members with the inference that some of the witnesses who have appeared here have been bought. If you believe that, I would ask you to indicate very specifically to us which you think have been, and why. That is my first question.

Secondly, the International Commission on Radiological Protection is an august international body, which is, as I said, or at least originally was dedicated to protecting people from radiation hazards. You intimate that, I cannot recall the exact words that you used, but at any rate, in the last several years, they have not been doing the job they should be doing in allowing levels to rise. I just ask you is it possible that there could be an alternative, not as your judgment suggests that they are irresponsible and not doing a proper job now, but that initially when there was less knowledge about radiation hazards that they deliberately chose a path of extreme caution so as to err on the side of safety if there was to be an error, and that with increasing knowledge over the years, they had recognized that it is, in fact, reasonably safe to increase the levels. So I would ask for your comment on that.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. You can answer the questions and include your conclusions at this time. Thank you.

Careers In Nuclear Industry

DR. EDWARDS: Yes, sometimes, Mr. MacQuarrie, the constraints of time make it necessary to be overly blunt. When I quoted Mr. Atherley in saying that "science is for sale", it is certainly a much more complex phenomenon than being bought. It is a question of a psychological commitment, a lifelong commitment, to an industry which is identified with so strongly that it comes to be viewed as an essential component of life. To people who have spent their careers in the nuclear industry, it is difficult to think of life without nuclear power. It is that deeply ingrained in their own personal lives, and this is a classic case of what you might call conflict of interest.

What I have tried to do, Mr. MacQuarrie, is to point out to you that among the witnesses that you have heard and among the literature that you may read, some was written by people who believe, like Dr. Kupsch, that a world without nuclear power is unthinkable; that we might have to revert to slavery if we do not have nuclear power; that there is some desperate need for the world to have nuclear power and that, therefore, we really do not have any choice but to do the best we can in minimizing the hazards.

Not everyone shares that point of view. Not everyone is so devoted to the nuclear power industry. For example, the Harvard Business School in 1979, I believe, published a task force report on energy strategy called "Energy Future" in which they said that nuclear power was only of marginal interest because it could not possibly replace imported oil. The point I was trying to make is that people who not only derive a livelihood, but are committed to an industry, are obviously going to have a certain perspective on that industry, and I think are psychologically forced to view certain topics in a certain light. For example, we must learn to live with radiation and to accept it as part of our lives, man made radiation, if that is going to be the way of the future.

Misleading Reports

Now, your second question had to do with whether the statement in this booklet, published in February of 1981, was deliberately misleading. I agree; I overstepped the bounds by saying "deliberately", but since I have called this very point to the attention of Atomic Energy of Canada Limited witnesses during the hearings of the royal commission on electric power planning, and since this was published so recently as February of 1981, and since it quotes the very report that I have here in my hand, called the BEIR report, in the very sentence in which it says the "linear hypothesis overestimates the risk", I have difficulty in understanding how it could be accidental. On page 141, in this book, it says, "The data available on human populations exposed to alpha emitters which includes underground miners, radium treated patients and radium dial painters, indicate that for cancer production, alpha radiation is many times more effective per rad of average tissue dose than are X rays or gamma rays delivered at high-dose rates. Human and animal data suggest that the effect per dose of alpha radiation at low-dose rates is greater than that at high-dose rates."

In another part of this report, it is quite clear that what this means is that the linear hypothesis does not overestimate, but in fact underestimates the risk; that the risk at low-dose is underestimated by the linear hypothesis for precisely the type of radiation which is involved most prominently in uranium mining and milling operations, namely, alpha radiation. Alpha radiation is given off by uranium, by radium, by thorium, by radon gas, by the radon daughters. It is the primary health hazard, and so I thought it was important to call to this Assembly's attention the fact that this prestigious body has concluded that the philosophy used by the Atomic Energy Control Board, which is the linear hypothesis, would seem to underestimate the risk at low doses. In my concluding remarks...

CHAIRMAN (Mr. Pudluk): The time is up. I would like to thank the witness.

Dr. Edward's Closing Remarks

DR. EDWARDS: Could I just make a couple of concluding remarks then? I would just like to conclude by thanking you very much for the opportunity to come here and share what little contribution I can offer to helping you resolve these thorny questions. I would urge you to please separate the evidence you have heard into two categories: Those which originate from people who are devoted to the nuclear option and those who are not so devoted, and compare notes internally with the evidence in those two segments of the testimony that you have heard.

I would also urge you to accept my test to the Atomic Energy Control Board because this way I think you can perhaps resolve, to some extent, this question of credibility. Finally, I would like to offer compliments to your staff who I have found have done a marvelous job in editing the transcripts, which are remarkably free from error, and also in attending to any needs that I had as a witness. Thank you, again.

---Applause

CHAIRMAN (Mr. Pudluk): Thank you, Gordon Edwards, for appearing in this House. Now the second witness is going to be Dr. Dave Myers. I wonder if the Sergeant-at-Arms could invite him to this House, and this is the last one of the uranium debate witnesses.

CHAIRMAN (Mr. Pudluk): Now, we are going to have 30 minutes and a 30 minute question period. Thank you, Sergeant-at-Arms. Dr. Dave Myers, you are going to start your opening remarks.

Presentation By Dr. Dave Myers

DR. MYERS: Thank you, Mr. Chairman. I must say that I am also very pleased to have the opportunity to listen to the many interesting talks here, and particularly the questions that have been posed here. I would like to, since this just came up, I am not responsible for this book, but I would like to come back to the quotation that Gordon Edwards is objecting to.

The latest reviews of scientific evidence on the effects of X rays and beta and gamma radiations, such as that conducted by the Biological Effects of Ionizing Radiation committee concluded that the linear hypothesis overestimates the effects of low-dose levels. That statement is absolutely correct. The BEIR committee said that in the case of X rays, beta rays and gamma rays, the linear hypothesis overestimates risks -- sorry, the majority of the committee stated that they believed that the linear hypothesis overestimates risks by a factor of two. There is another body in the United States which is independent; it is called the National Council on Radiation Protection and Measurements. In 1980 they also came out with a review of the topic and said that in these particular cases, the linear hypothesis overestimates the cancer risks by a factor of two to tenfold. Atomic Energy of Canada has absolutely no apologies to make for that statement quoted in that book.

I would also like just to comment on what are called follow-up studies. This is looking at what happens to people who have been exposed to radiation either in uranium mines or in other places. All of the initial studies that were done were carried out by various individuals without any public pressure; public pressure developed later. The first report of excess lung cancer risks at Elliot Lake was brought out by Dr. Jan Muller of the Ministry of Labour in Ontario in 1971. Canada has a very high reputation actually for studies on the follow-up of people exposed to radiation.

There was a study carried out in Nova Scotia in the 1960's on what happens to people who were treated repeatedly with X rays for the diagnosis of tuberculosis. There is a study on the fluorspar miners in Newfoundland. Again, these reports were put out in the scientific literature and only subsequently was a government investigation held.

Ontario Hydro study has been putting out annual reports for the last nine years. As far as the Port Radium miners are concerned, this was mentioned earlier. The study is being carried out at present. The final data have not yet been presented to anyone. The data are being analysed by the national cancer institute of Canada, and the study is being financed by Eldorado Nuclear. I happen to know that there has been some excess of lung cancers detected in the people living in Saskatchewan who had worked in the Port Radium area, and further that the names of these people have been submitted to the Workers' Compensation Board for consideration for workers' compensation; that is, their families.

Document Produced By BC Medical Association

I would like to start out with this document by the British Columbia Medical Association which is frequently quoted. When I was listening to Dr. Bob Woollard who I have listened to before, I again got the impression that this is a very conscientious and sincere person. I would that I could compliment him on the document produced for the British Columbia Medical Association. Unfortunately I personally cannot do so. On reading through this document, I find that the lung section written by Dr. Young is very selective and non-critical in its quotations.

I would again repeat my earlier suggestion if Dr. Woollard of the British Columbia Medical Association wishes this document to be taken seriously by scientists in Canada or in other countries, it should either be submitted to an independent scientific committee in Canada for review, or if they really feel that there is anything at all original in their review, it should be submitted for publication in a scientific journal where scientists around the world would be made acquainted with their findings. Until such time as they have done so, any opinion expressed on the factual portion of this document that was written by Dr. Young is only the opinion of one scientist, namely myself, and I would say that Dr. Young is incorrect in the facts that he quotes probably without knowing it. I could give examples of that; I will not. I would, however, suggest that the British Columbia Medical Association get a second opinion on the actual factual information they are quoting. I am not referring to the philosophical opinions that are quoted.

I would like to correct also a minor error that I made in the first time I was talking to you in Yellowknife about this particular document. I said at the time it was not available to the Control Board. It was not available to me at Atomic Energy of Canada. I happen to know members of two of the outside scientific committees that advise the Atomic Energy Control Board, and I knew that neither of these two committees were aware of the existence of this British Columbia document in February. Since that time, I personally have brought it to the attention of members of both of the Control Board committees. I have no idea what action they will take on it or what will happen, but they are now aware of it.

I gather that Dr. Edwards did not like my testimony to you in Yellowknife and that a letter on this topic be distributed to each of you, and I might just refer to a couple of the points. I referred to the use of radio-active materials for the treatment of cancer and for medical diagnosis of disease. The particular material used for cancer treatment is called cobalt-60. This was previously produced in the nuclear reactors at Chalk River and is now being produced in one of the commercial reactors at Pickering in Ontario. The reason this is done, this is the cheapest way to obtain this material for the treatment of cancer. It has never been produced on a commercial scale by a cyclotron because this would be much more expensive.

To date, the cobalt-60 produced in Canada has, as I mentioned earlier, been used to prolong the life of approximately eight million people in various countries. The other radio-isotopes produced in Canada by Atomic Energy of Canada have been used to diagnose disease in hospitals in millions of other people. If Dr. Edwards believes the lives of eight million people are not significant, I would disagree with him.

I would also point out that electricity in Ontario is produced by nuclear reactors because the people in the business of selling electricity believe this is the cheapest and safest method of producing electricity when hydro power from rivers is limited. Then, for example, one does not have problems with acid rain, as one does from coal-fired power stations, the number of fatal accidents associated with the mining of uranium is much smaller than that associated with the amount of coal required to produce the same amount of power. The electricity produced with nuclear reactors is, according to the people in the business, considerably cheaper than that produced with either coal or oil. I might add that at the moment, all of the uranium required for reactors in Ontario is being mined in Ontario. That which is mined in Saskatchewan and other potential areas is at the moment sold to other countries.

Levels Of Radiation In Drinking Water

I think you would be more interested in the health effects of radium and of radon and I wanted to spend some time on the numbers. As I said before, the levels of radium in the water of the Serpent River system, which is the Elliot Lake area in Ontario, were reasonably safe. I also said they were not unsafe. Now, to explain what I am talking about, I will have to use a particular dose unit called a picocurie. I will refer to the International Commission on Radiological Protection as ICRP.

In 1941, United States regulatory agencies suggested that the amount of radium in the human body should not be allowed to exceed 100,000 of these picocurie units. In 1959 the ICRP, in its first official recommendation on the topic, adopted the same standard. I can leave some information for you so that you can follow this up for yourselves. It also gives the names of the people involved in the ICRP, United Nations Scientific Committee, and the Committee on the Biological Effects of Ionizing Radiation. You can judge for yourselves whether you think these people would be biased.

Now the ICRP is a group of scientists from a variety of countries who are selected for their knowledge in a given area. The method by which these people are selected is described in the attached documents in the ICRP which I would like to leave with the Clerk later. On page 12 of the 1959 recommendations, we read the following: "Man has had years of experience with radium which is the basis of reference in choosing maximum permissible body burden of other similar radionuclides. The radium dial painters, patients treated medically with radium and persons using public water supplies relatively rich in radium have furnished the best source of continuous human exposure from which to observe the effects. These studies have continued from that time up to the present date."

So, on this basis of this experience, the ICRP felt that the 1941 recommendation of 100,000 units in the body was reasonable as a maximum permissible limit. The problem then becomes how much radium in drinking water or in food would result in the accumulation of this amount of radium in a person. Because knowledge was less extensive the ICRP in 1959 decided to be cautious and recommended that levels in drinking water should not exceed 100 units per litre. The Canadian federal government adopted this number, introduced a safety factor of 10 in order to protect the public, so they ended up with 10 units per litre. The Ontario government, in its wisdom, chose to put in a larger safety factor, a value of 30, and came up with the recommendation of three units per litre.

In 1968, the ICRP, having received further information on this topic, indicated that the maximum levels in drinking water could be raised eightfold in order to maintain exactly the same standard of safety. Further research was carried out in various laboratories and various countries to determine how much of the radium in food or drinking water is actually retained in the body. After considering these results, in 1979 the ICRP came out with its most recent recommendations, and set a maximum limit of 2700 units, that is 2700 units per litre, in drinking water. I might add this maximum limit is not based on the cancer hazard of radium, if it were, the limit would be higher. What is being said is that, in the light of the research carried out since 1959, the amount of radium in drinking water or food that would result in the accumulation of 100,000 units in the body after 50 years of continual exposure, is equivalent to 2700 units per litre of drinking water.

The federal Department of Health and Welfare has consequently recommended maximum permissible concentrations of radium in public drinking water should be raised to 27 units per litre. This incorporates a safety factor of 100. It is my understanding that the provincial government is considering the same limit, that is, a limit which includes a safety factor of 100. At the moment, the current Ontario standard is still three units per litre; that is, it includes a safety factor of 1000 below the limit recommended by the ICRP.

Risk Of Cancer

Well, what do we expect would happen at three units per litre? Based on data which have accumulated, in the follow-up of radium dial painters, radium chemists, people who were injected with radium by medical doctors for various purposes, the situation up to 1978, which is the last report I have seen, can be summarized as follows: No harmful effects were detected in any of about 1000 people who were known to have less than 500,000 units of radium in the body, 500,000 is five times the limit permitted by the ICRP. Above this level, radium is known to cause bone cancer. Now, 1000 people is not a large number. There is about one chance in 10 that the dose response curve might be linear.

That is to say that the risk of cancer is directly related to the amount of radium in the body. If this is true, then drinking water containing three units of radium per litre, every day, all of one's life, would produce a cancer risk of one for every 100,000 persons. As I indicated earlier, the chances are nine out of 10 that the actual value would be zero. As a value judgment, I would claim that this is reasonably safe. Even at levels of radium which are 1000 times higher, the chances of a fatal cancer for persons drinking this water every day of their life would be one in 100, if the effects are directly proportional to amount of radium.

Even this risk may not seem unreasonable if we compare it to other risks in our own society. You will find some of these risks tablulated in the report on "Health of Radiation Workers" which was left with you in Yellowknife. For the average Canadian who lives to age 18, the chance of death from some cause before age 65 is one in five. A small proportion of these deaths are associated with working. According to Labour Canada, one out of every 20 persons who earns their living by hunting, fishing and trapping will be killed in a fatal accident sometime between age 18 and 65, as a result of this method of earning a living. I leave these numbers with you so you can decide for yourself whether my value judgment agrees with your own perceptions.

I might add, the risk to the caribou or to other animals who drink this water will not be greater than the risk to ourselves as human beings. Nevertheless, we would like to reduce these risks as much as possible. The actual concentration of radium in the Serpent River in Ontario in 1978 averaged four units per litre. The source of that information is the Ministry of the Environment for Ontario. The chief of the Serpent River Indian band asked the federal Department of Health and Welfare about these hazards. The federal Department of Health and Welfare collected their own water samples; they caught fish in the Serpent River, and they measured levels of radio-activity. In 1976 the regional director of the federal department wrote back to the chief of the Indian band to say that the amounts of radio-activity in fish in the water were too small to be hazardous.

Measures To Control Radium Releases Are Working

I have a copy of another letter by Mr. Conroy of the Ministry of the Environment, in which he provides more information on levels of radium in the Serpent River for the same purpose. There are two points I would like to make. First, you can get detailed information from government departments when you inquire. Second, the levels of radium in the Serpent River have been decreasing steadily since 1965. In other words, the measures that have been instituted to control radium releases are working, and they can be made to work in the Northwest Territories or Saskatchewan, as well as in Ontario. According to the information provided by Mr. Conroy, the radium levels in the Serpent River in 1980 were down to two units per litre, which is very close to what they would have been if there had never been any uranium mining in the Elliot Lake area.

I do not have time to go into Dr. Edwards' other comments in detail. I believe he is equally misinformed on the other topics that he mentions in his letter. If you request it, I would be happy to document that statement in writing to you at a later date.

Health Hazards Of Radon

I just want to end up with the health hazards of radon. As you have heard, radon diffuses out of the ground everywhere; the amount that comes out of the ground is roughly proportional to the amount of radium in the ground. It is not a new hazard, people have lived with it, and a few have probably died from it, for thousands of years already. What is new is the fact that we now know that it exists, and we can control the levels to which we are exposed. In the silver, gold, and pitchblende mines in eastern Germany that have been mentioned several times, miners were exposed to radon levels in the region of 100 working levels for some 400 years without anyone knowing it. Nobody even knew at that time that

radon existed. In the uranium mines that were started up after World War II in Czechoslovakia and the United States, miners were again being exposed to 50 to 100 working levels for a few years before anyone became aware of that fact. The levels in uranium mines in Ontario in the 1950's were somewhat lower, but still very high. Some of the miners in all three areas died later as a result of these high exposures. However, concerned scientists were aware of the hazards. As early as 1945 Dr. J.S. Mitchell, who was the first director of the biological division at Chalk River with which I am now associated, wrote a report recommending that miners should not be exposed to more than one-half of a working level. To remind you, I am telling you that the miners in the United States, Czechoslovakia, were being exposed to 50 to 100 working levels. The recommendation from Chalk River at that time was one-half of a working level. In 1959, the ICRP recommended a maximum permissible concentration of one-third of a working level. Two scientists from Chalk River were both directly involved in that decision, and their names are in this report from the ICRP. Now, this recommendation was not adopted, was not accepted either by the Ontario government or by the United States government. Not until 1975 were the ICRP recommendations implemented in Ontario.

Exposure Of Miners To Levels Of Radiation

As you heard yesterday from Dr. Chambers, or was it the day before yesterday, most miners in Canada are currently exposed to much lower levels, in the region now of 0.1, that is, one-tenth of a working level. These levels are very much lower than the values of 50 to 100 to which miners were exposed shortly after World War II, and which tragically resulted in a number of cases of lung cancer in these miners. It is still anticipated that a hazard exists, but the hazard from radiation from radon daughters is thought to be relatively low, and in the same region as the hazards to which persons working in other industries in Canada are exposed.

If a miner is exposed to one-tenth of a working level in the mines for 12 months of the year, his accumulated exposure over the year is one-tenth times 12, or approximately one working level month per year. As mentioned by Dr. Chambers, 55 per cent of the uranium miners in Canada accumulate less than one working level month per year at present. The other 45 per cent are more than this; the average for all miners is about one working level month.

The United States National Academy of Sciences report in 1972, that is the report before the last one everybody has been quoting, their report in 1972 indicates that for every 10,000 persons exposed to one working level month, between one and five will be expected to die of lung cancer at some later date in their life. The United Nations report of 1977 suggested that that number would be two to four. The 1980 report from the United States National Academy of Sciences, the one which Dr. Edwards and other people have quoted, suggests that the number would be one and a half to six. In other words, these scientific committees since 1972 have all been coming up with numbers which are approximately the same. The estimates of lifetime risk have not changed appreciably.

If we use the United Nations numbers, which are right in the middle, this means that a person who worked in a uranium mine for 50 years, under current operating standards, would accumulate a total of 50 working level months over that time, and that this person would have a one to two chances in 100 of dying from lung cancer at some later date as a result of the radon exposures in the mine. This number, that is one to two chances per 100 after 50 years of work, this number is approximately the same as the risk of a fatal accident...

CHAIRMAN (Mr. Pudluk): I am sorry. I will have to cut you off because the time is up.

DR. MYERS: Mr. Chairman, might I say two more sentences, and then quit?

SOME HON. MEMBERS: Agreed.

CHAIRMAN (Mr. Pudluk): Proceed.

DR. MYERS: This number is approximately the same as the risk of a fatal accident to persons who work for 50 years in government or in the transportation and communication industries in Canada. These are the best numbers available. I leave it to you as a legislative body, and to the miners themselves, to decide whether that is an acceptable risk. I thank you very much.

---Applause

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. It is now 9:00 o'clock. I wish to report progress.

MRS. SORENSEN: Mr. Chairman...

CHAIRMAN (Mr. Pudluk): A point of order, Mrs. Sorensen? Proceed.

Motion To Extend Hours Of Sitting, Carried

MRS. SORENSEN: Mr. Chairman, I would move to extend the sitting hours to 9:30 in order to hear the Members' questions, and perhaps meet later tomorrow morning than we had anticipated, in order to be finished with the uranium debate and start fresh in the morning on our regular basis. So that is a motion to extend our hours to hear the questions to Dr. Myers.

SOME HON. MEMBERS: Agreed.

CHAIRMAN (Mr. Pudluk): All those in favour of that motion? One, two, three, four -- the motion is carried.

---Carried

We are going to have half an hour, 30 minutes, for a question period. Bob MacQuarrie.

MR. MacQUARRIE: Thank you, Mr. Chairman. Dr. Myers, an earlier witness, Mr. Amarook, expressed a very deep and genuine concern about what would happen to the land and the wildlife and the people, particularly in his region, in the Keewatin and around Baker Lake, if uranium exploration and mining were allowed, and that is, when all is said and done, that is the fundamental question. People are concerned about what is going to happen to them, and they have every right to be. So, I know that as a scientist you do not like to make value judgments and try to impose them on other people, I respect that, but can you give us some picture of the kind of risk or danger that might fall upon the people in that area if these activities took place, and maybe try to make a comparison. For instance, you might compare -- you said one in 20 might be killed in the traditional occupations of hunting and trapping between the ages of 18 and 65, so can you compare the kinds of risk we are talking about in uranium exploration and mining compared to that risk?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Dr. Myers.

DR. MYERS: Mr. Chairman, I think the easiest way to explain that is, if a person works for 50 years in hunting, fishing and trapping, he has one chance in 20 of being killed while engaged in that occupation. If a person drinks water containing three units of radium per litre, such as might possibly be coming from a stream which was connected to a uranium tailings area, his chance of anything untoward happening to him is one in 100,000. It might also be zero and 100,000, but we will accept the fact that one in 100,000 may well be correct. The risk from radon daughters coming off the tailings pile cannot be measured. I said earlier, at a distance of 10 kilometres away you cannot detect in the radon levels in the air. Mr. Chambers this week stated that this was true even at one kilometre in the Elliot Lake area. I would say that if one were living more than one kilometre from the mine and mill tailings, there is no extra hazard due to the radon in the air.

Risks To Animals And Fish

As for the effects on animals and fish living in the area, they will be of the same order of magnitude as those to human beings. In other words, they will be extremely small. They will be the same as to human beings. They are very minute risks. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Mr. MacQuarrie.

MR. MacQUARRIE: In that risk of one to 100,000 if they had drank water with that level of radium, you said "something untoward happening to them", would that mean that that one in 100,000 would not necessarily be a death, either, but some sort of effect resulting short of death? Is that what would be meant? Finally, just to clarify it again, did you say that if one were to live more than one kilometre from a properly supervised tailings area, that there would be no extra hazard from radon daughters?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. MacQuarrie. Dr. Myers.

DR. MYERS: Mr. Chairman, as to the type of effect that would be produced, it would be a cancer. It would not necessarily be a fatal cancer, but a cancer is a cancer. When I was talking about one kilometre, I was quoting Dr. Chambers' figures from the Elliot Lake area. Yes, at one kilometre the change in the radon levels in the air cannot be detected. There are, of course, other problems depending on where one builds houses; if one builds houses on ground which is very radio-active, the radon which is coming out of the ground naturally -- it is nothing to do directly with the mill or mining tailings -- but the radon which is naturally coming out of the ground may cause high levels in those houses. Did I answer your question?

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Mr. Patterson.

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. Dr. Myers, I find it hard to believe that you could say that the risk to animals is the same as the risk to humans. Have you considered or do you know how much food, over what area, one caribou eats and ranges over a year, and when you are talking about risk to humans have you considered the effects of the food chain, the fact that humans will eat the caribou meat? I would put to you that if you do not know how far caribou range, and if those studies have not been done, then it is perhaps irresponsible for you to suggest that the risk to animals is no greater than the risk to humans, and perhaps you should consider that humans in the Northwest Territories eat animals, which would concentrate those toxic substances. Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Myers.

DR. MYERS: Yes, Mr. Patterson, you have a very good point. I may have misled you when I said that the risk to animals would be about the same as to humans. I was referring to two specific risks, which are the risks from radon coming from the mill tailings, radon in the air, and the risk from drinking water containing radium. In so far as those two risks are concerned, one certainly expects that the risk would be similar for animals such as the caribou and for human beings. I have not considered, though, what changes might occur in the vegetation, and I do not know what -- may I just leave it at that? I do not want to say anything more than that. I am only talking about radon daughters in the air, and radium in the water. Did I answer your question?

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Any more questions? Mr. Stewart.

Effects Of Tailings On Port Radium Miners

HON. DON STEWART: Mr. Chairman, I was pleased to hear that a study was under way on the Port Radium workers. I wonder whether the witness can indicate whether he can get this paper or the results of this paper to us as soon as it becomes a public document, so that this House can have a look at the effects of uranium mining in the Northwest Territories?

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Stewart. Dr. Myers.

DR. MYERS: Yes, Mr. Chairman, I was just writing that down. I think it will be in 1982, I am not certain, because I am not responsible for that project, but I have heard the estimate that the final report is going to be available next year. When it is available, I hope to remember to send you a copy. I will do that, yes.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Mr. Stewart.

HON. DON STEWART: Mr. Chairman, Echo Bay Mines is still operating in the area, and their campsite is relatively the same campsite that was used by Eldorado mining, and they are working bore number one or number two on a silver operation, although this was a uranium mine to start with. I wonder if we could have any update with regard to the effect on the miners who have been working for Echo Bay Mines, because the tailings, as far as I know, and I was there a couple of years ago, are still in place in Great Bear Lake. I would not be a bit surprised if the water intake line is not the same as it was when I was there. I was just wondering if we could get an update with these people that are living there under the circumstances that people are concerned about, in close proximity to a tailings pile that has been in place since 1935, so that we could get some comparisons and just see what really is going on in this respect. I suggest to you that the silver mine, although it is a silver operation, that the mine must undoubtedly be high in radon gas because it was a uranium mine at one time.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Stewart. Dr. Myers.

DR. MYERS: Mr. Chairman, much as I would like to do something about that, I do not really know what I can do. I know what is going on in Ontario. In Ontario they are studying all hard-rock miners, not just uranium miners. I am not aware of any similar study being carried out in the Northwest Territories, except the one that is associated with Eldorado Nuclear. I really do not know how to get that information for you.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Are there any more questions from the floor? Mr. Noah.

MR. NOAH: (Translation) Thank you, Mr. Chairman. I have two questions. I will make them brief. I am not aware about the decision on radiation, but the first question I have is why do you talk about radiation? Is it because we have a shortage? Is it because they have a shortage of uranium that they propose to open a mine in the Northwest Territories? I am saying that uranium is not the only avenue to energy. I am totally uninformed on this part of my question. I really do not know how to put it. When you talk about uranium that comes from the land, and when it enters our body, or if we were to be affected by it physically, how much would we have to have in our system before it affects our health? I am talking about natural radiation in our bodies. How much do we have to be exposed before we can become physically ill, and how long would you have to be exposed? Thank you.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Dr. Myers.

DR. MYERS: Mr. Chairman, if I understood the first question correctly, I do not think I am really the proper person to answer it. I understood it to be why is there uranium exploration going on here? Is there a shortage of uranium ore? As far as Ontario is concerned, there is not a shortage of uranium ore for their own purposes. This ore is being sold, I believe, in the same way that people are selling natural gas to the United States, or selling coal to Japan and various other countries, as a commercial venture. That is all I know about that topic. Did I answer that question correctly?

Exposure To Background Radiation

I could go on to the next question, if you like. Yes, how much radiation do you need to affect a person? We are normally exposed to levels -- our natural average level is estimated to be responsible for about one in every 200 fatal cancers. To the best of our knowledge it has no other effect on the person that is exposed to this amount of radiation. It may also contribute a very small fraction to the number of hereditary defects that occur normally in human populations. The contribution is in the same order of magnitude, that is to say, possibly one in every 200 genetic defects that occur normally are due to exposure to background radiation. When we are talking about changing background radiation levels, by, let us say, one per cent, 10 per cent, whatever figure you want, the effects are presumed to be in direct proportion to the increase in the radiation dose. That is to say, if you double the radiation dose, you will double the number of effects.

As for other forms of illness, you know, there are a couple of things I should mention. Extremely high concentrations of uranium, and these are concentrations to which a person is never normally exposed, as a result of uranium in water from mill tailings -- extremely high concentrations of uranium can produce kidney damage, in the same way as any other heavy metal. It is not a radiation effect. It is due to the fact that it is a metal. The concentrations of uranium in water are also monitored in the Elliot Lake area.

In order to become, what shall I say, physically ill, so that you want to vomit or anything, that you feel bad, you would need extremely high doses in a very short period of time and you will never receive these types of doses as a result of uranium mining and milling. The workers will not and the people in the environment will not. The two things that we worry about, which I mentioned, are cancers and hereditary changes and these are both believed to represent a small component of the natural incidence. A small component of the natural incidence is believed to be due to natural radiation levels. Did I answer the question fairly?

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Mr. Noah.

MR. NOAH: (Translation) I understood what you said, Dr. Myers. I understood you to say, when you talk about natural radiation, if it enters our bodies it may be small -- even though it is small, it is dangerous. I wanted you to say yes or no. I do not fully understand when you go into a scientific explanation. I simply wanted you to state yes or no. Even if we get a small dose in our body of natural radiation, is that dangerous to our bodies, our health? All I simply wanted was yes or no for an answer.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Noah. Dr. Myers, yes or no?

DR. MYERS: Mr. Chairman, the answer is yes. There is an extremely small hazard from radiation in our body.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Mr. Patterson.

Risk Of Lung Cancer In Ontario Miners

HON. DENNIS PATTERSON: Thank you, Mr. Chairman. Dr. Myers, I want to try and clarify what appears to be a clear contradiction between you and Dr. Edwards. Now, you say there is a one to two per cent risk of lung cancer in miners in Ontario working for 50 years. I think you just said that, and you will tell me if I am wrong, but according to Dr. Edwards the BEIR 1980 study, which he presented and I imagine you are familiar with, says that 12 to 17 working levels may be a doubling dose for cancer in miners. Now, the report of Jan Muller says that the lifetime risk for Ontario males now is 5.4 per cent and if 12 to 17 working levels would double that, then that would make the cancer risk 10.8 per cent, rather than one to two per cent. Can you clarify this dilemma for me? Thank you, Mr. Chairman.

CHAIRMAN (Mr. Pudluk): Thank you, Mr. Patterson. Dr. Myers.

DR. MYERS: Yes, Mr. Chairman, I can clarify that very easily. Dr. Edwards has selected certain quotations out of the BEIR report. He has not tried to use these to calculate lifetime risks. The BEIR report does include tables which give lifetime risk of lung cancer as a result of exposure to radiation. The values I am quoting are derived from these tables and they are the estimates that were given by the majority of the BEIR committee as being most likely to be correct, and the value is, as he correctly stated, one to two per cent, yes.

CHAIRMAN (Mr. Pudluk): Thank you, Dr. Myers. Do you have any closing remarks? We have got five minutes.

DR. MYERS: Mr. Chairman, I think we would all like to go home. I would like to thank you all very much, once again, for the opportunity of being here and I would very much like to renew my invitation. If any of you are ever able, either on business or for other reasons, to be in the area of the research station at Pinawa in Manitoba or the research station at Chalk River in Ontario, we would be delighted to meet you and to welcome you and to take you around the place. Thank you.

---Applause

CHAIRMAN (Mr. Pudluk): Thank you, Dr. David Myers. Before I report progress, I would like to thank the uranium debate witnesses, Dr. Bob Woollard, Mr. Doug Chambers, Mr. Michael Amarook, Dr. Walter Kupsch and Dr. David Myers and Dr. Gordon Edwards. Also, I would like to make a very special thanks, especially for the Pages for the long hours, which they are working hard for us. Now, I wish to report progress.

---Applause

MR. SPEAKER: Mr. Pudluk.

REPORT OF THE COMMITTEE OF THE WHOLE OF URANIUM MINING AND EXPLORATION

MR. PUDLUK: Mr. Speaker, your committee has been considering uranium exploration and mining and wish to report this matter concluded.

HON. DENNIS PATTERSON: Not yet.

HON. ARNOLD McCALLUM: Soon.

MR. SPEAKER: Thank you Mr. Pudluk. Let the record show that the uranium debate has proceeded as far as we can at this time, because I would imagine that it has not been really concluded. Mr. Clerk, announcements and orders of the day.

ITEM NO. 16: ORDERS OF THE DAY

CLERK OF THE HOUSE (Mr. Remnant): No announcements, sir. Orders of the day, 9:30 a.m., Saturday, May 23rd, 1981.

1. Prayer
2. Replies to the Commissioner's Address
3. Oral Questions
4. Questions and Returns
5. Petitions
6. Tabling of Documents
7. Reports of Standing and Special Committees
8. Notices of Motion
9. Motions
10. Consideration in Committee of the Whole of Bills, Recommendations to the Legislature and Other Matters: Sessional Paper 1-81(2); Bills 1-81(2) to 8-81(2) inclusive
11. Third Reading of Bills
12. Assent to Bills
13. Orders of the Day

MR. SPEAKER: Thank you, Mr. Clerk. The House will note that we changed the hours from 8:30 to 9:30, because we concluded basically with the witnesses. So, the starting time will be at 9:30 tomorrow morning. The House stands adjourned then until 9:30 a.m., May 23rd.

---ADJOURNMENT

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