VERBATIM TRANSCRIPT;

KEEWATIN URANIUM WORKSHOP

BAKER LAKE, N.W.T.

MARCH 1-2, 1989

INDIAN & NORTHERN AFFAIRS CANADA

YELLOWKNIFE

N.W.T.

December 1989

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PREFACE

This report is a transcript of the tape recording of a public workshop on uranium and uranium mining, organized by Indian and Northern Affairs Canada (INAC) on March 1 and 2, 1989, in Baker Lake, NWT.

The workshop was held in response to a commitment made by INAC to the Tungavik Federation of Nunavut and several Keewatin associations.

The aim of the workshop was to provide the basic technical information on uranium and radioactivity, including health and environmental concerns, as well as a step by step review of the different facets of uranium mining, emphasizing the potential environmental and health implications and the regulatory controls.

The tapes were transcribed by Puulik Translation Ltd., Yellowknife, N.W.T. The final report was prepared by the Environment and Conservation Division of this Department.

Although utmost care was taken in preparing this report, some errors or omissions may still exist, due to inaudible portions on the tapes. Further, the report may lack some clarity as the visuals (overheads and slides), used by the presenters, have not been included.

During the Workshop a video tape recording was made by the Inuit Broadcasting Corporation, Rankin Inlet; a copy of the video tape is available for viewing, from this Department in Yellowknife.

I am pleased to extend my sincere appreciation to all the organizations and to everybody who contributed to making this Workshop a success.

Angus Robertson
Director,
Renewable Resources & Environment

INVITATION TO WORKSHOP

January 30, 1989

To:

Re: Keewatin Uranium Workshop Baker Lake, March 1 - 2, 1989

To fulfil a commitment made by Indian and Northern Affairs Canada (INAC) to the Tungavik Federation of Nunavut (TFN) and several Keewatin associations, we are sponsoring the Keewatin Uranium Workshop in Baker Lake, on March 1 - 2, 1989.

The workshop will provide the basic technical information on uranium and radioactivity, including health and environmental concerns, as well as a step by step review of the different facets of uranium mining, emphasizing the potential environmental and health implications and the regulatory controls. It will be held in the Baker Lake Community Hall, starting at 9 a.m. each day.

We are pleased to invite representatives of your organization to attend and participate in this workshop. We will reimburse the travel and accommodation expenses of up to five (5) of your representives. The reimbursement will be made in accordance with Treasury Board Directives, on the submission of invoices, as shown in the attachment. Please send us the names of your representatives for reimbursement and their points of departure.

A copy of the workshop agenda is also attached.

If you have any question on the above, please call me (403-920-8263) or Ranjit Soniassy (403-920-8246) of this Department.

I look forward to seeing you and your colleagues in Baker Lake on March 1 -2.

Sincerely,

Pierre Laporte
A/Director
Minerals & Economic Analysis
Northern Affairs Program
P.O. Box 1500
Yellowknife, N.W.T.
X1A 2R3

WORKSHOP AGENDA

Part I: *Uranium and Radioactivity*

a) basic concepts and radioactivity
- *video on radiation (Carmel Letourneau)*
- *basic radioactivity concepts (Carmel Letourneau)*
- *radon gas and its daughters (Bernie Zgola)*
- *effects on living organisms (Carmel Letourneau)*

b) movement of radioactive contaminants
- *water systems (Greg Brunskill)*
- *radon and dust particles (Bernie Zgola)*
- *air transportation (Carmel Letourneau)*

Part II: *Uranium Mining Operations*

a) regulatory framework
- *AECB regulations (Bernie Zgola)*
- *Saskatchewan regulations (Ron Barsi)*

b) infrastructure
- *Saskatchewan mines (Ron Barsi)*
- *Kiggavik mine (Mick Stuart)*

c) mining and ore processing
- *Saskatchewan examples (Ron Barsi)*
- *Kiggavik mine (Mick Stuart)*
- *AECB requirements and controls (Bernie Zgola)*

d) tailings treatment and disposal and water use
- *Saskatchewan case studies (Cliff Potter)*
- *Kiggavik mine (Mick Stuart)*
- *permafrost (Allan Judge)*

e) transportation and use of concentrates
- *Kiggavik mine (Mick Stuart)*
- *AECB regulations (Bernie Zgola)*

f) monitoring
- *DOE studies (Dennis Lawson)*

g) EARP/Hearings
- *future plans for review (Paul Scott)*

RESOURCES AND OTHER PERSONNEL

(1) Department of Indian Affairs and Northern Development:

Pierre Laporte
Ranjit Soniassy
Floyd Adlem
Bev Genest-Conway
Anne Snider
Dennis Trudeau
Henry Kablalik

(2) Atomic Energy Control Board:

Bernie Zgola
Carmel Letourneau

(3) Department of Fisheries and Oceans:

Greg Brunskill
Steve Harbicht

(4) Department of Environment:

Dennis Lawson
Tim Sackmann

(5) Geological Survey of Canada:

Allen Judge

(6) Federal Environmental Assessment Review Office:

Paul Scott
Patricia Woodward

(7) Government of the Northwest Territories:

Jamie Bastedo
Steve Matthews
Doug Heard
Lorne Matthews
Neil Thompson
Kort Mackenzie
Dianne Thompson
Dan Workman

(8) Saskatchewan Environment:

Ron Barsi
Cliff Potter

(9) Urangesellschaft:

Mick Stuart
Don Lush
Peter Cooper

(10) NWT Chamber of Mines:

Wanda Sheldrick

LIST OF ORGANIZATIONS INVITED

Keewatin Wildlife Federation

1) *Tagak Curley - Rankin Inlet*
2) *Thomas Suluk - Eskimo Point*
3) *Andy Kowtak - Whale Cove*
4) *David Putumirartuq - Chesterfield Inlet*

Keewatin Inuit Association

1) *Louie Pilakapsi - Rankin Inlet*
2) *Annie Tatty - Rankin Inlet*
3) *Amthyne Kadjuk - Chesterfield Inlet*

Keewatin Regional Council

1) *Peter Kritaqliluk - Eskimo Point*
2) *Paul Kaludjak - Rankin Inlet*
3) *David Kritterdlik - Whale Cove*
4) *Jackie Nakoolak - Coral Harbour*
5) *John Kaunak - Repulse Bay*
6) *Jack Hicks - Rankin Inlet*
7) *Jim Harding - Regina, Sask.*
8) *Paul McKay - Ottawa*

Tungavik Federation of Nunavut

1) *Tongola Sandy - Rankin Inlet*

Keewatin Regional Health Board

1) *Rosie Oolooyuk - Rankin Inlet*

Municipality of Baker Lake

1) *David Simailak*
2) *Residents of Baker Lake*

Telephone 819 - 793-2874

BAKER LAKE, N.W.T.
X0C 0A0

IMPORTANT NOTICE

The Department of Indian and Northern Affairs will be holding meetings on Wednesday, March 1 and Thursday, March 2 at the Community Hall.
These important meetings are for the public and will discuss uranium mining. The meetings are from 9 a.m. to 5 p.m. both days.
It is important that the residents of Baker Lake attend these meetings to learn about uranium mining.

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CHAIRMAN:
Pierre Laporte: ... Northern Affairs Program of Indian and Northern Affairs Canada, Yellowknife. Some of you might remember me as district geologist in the Keewatin. I've been in and around the Keewatin for 16 years, until about two years ago. The researchers are here at the request of TFN and KIA to discuss with you the regulatory, environmental and health aspects of uranium, uranium mining and radioactivity.

Among the representatives - I think I'll just name them and have them stand up so you guys can match a face to the people: from the Department of Indian and Northern Affairs we have myself, Pierre Laporte, Ranjit Soniassy, Beverly Gennest-Conway, all of whom are working out of Yellowknife; Floyd Adlem, standing in the back. Some of you might know Floyd from his work in Land Use. Anne Snider from Ottawa, and our district manager, Dennis Trudeau standing at the back there, who is based out of Rankin. He's in charge of land use and water licences in the Keewatin. From the Atomic Energy Control Board, the main agency regulating uranium and uranium mining, are Bernie Zgola and Carmel Letourneau. The Department of Fisheries and Oceans has got two representatives, Greg Brunskill, a research scientist, and Steve Harbicht. The Department of Environment has got Tim Sackmann, who is based in Yellowknife. From the Geological Survey of Canada we have Dr. Allen Judge. From the Government of the Northwest Territories we also have a number of people. Jamie Bastedo, Doug Heard the caribou biologist, Lorne Matthews, Neill Thompson and Kort Mackenzie representing the Department of Health and Welfare. Saskatchewan Environment has been kind enough to rent us two people, Ron Barsi and Cliff Potter.These gentlemen have experience with the uranium mines in Saskatchewan and that's why they're here to illustrate what will happen at Kiggavik. Finally we have a number of representatives from the mining company, Urangesellschaft, Mick Stuart, with whom most of you are familiar, and Don Lush the Environmental Consultant for Urangesellschaft, as well as Peter Cooper who is with a company that is a partner to Urangesellschaft.

We are here to answer your questions so please feel free to ask any questions you want. If we do not have the answer, we will arrange to find the answer and send it back to you. A copy of the business cards of most of the government representatives and some of the other representatives, the other people that came down with us, are available and can be made available to you if you request. Beverly will give you copies.

To ensure that our message gets out to as many of the people of the Keewatin as possible, we have arranged for representatives of major organizations in the

Keewatin to come and be present. Invitations were sent to KRC, KIA, KWF Keewatin Chamber of Commerce, and Arctic College. As I said, the purpose is to inform you of the basic principles of radioactivity and of the regulatory, environmental and health aspects of uranium mining.

We have structured the workshop in two parts: part one is the section we have this morning. We have biologists who will describe the basics of radioactivity, its effect on living organisms, or living things, and how contaminants, both radioactive and non-radioactive, are transported in water and air and where they come to rest. The section on basic concepts of radioactivity will start with a video which will be shown right after I finish speaking, next door in the coffee room. We have time to have coffee.

In part two we will discuss the different aspects of uranium mining. Each section will first be illustrated by examples from northern Saskatchewan, where uranium mines similar in size to the proposed Kiggavik project have been in operation for a number of years. Then the representatives from Urangesellschaft Canada, the proponents of the Kiggavik project, will describe how their proposal is similar or different from those that have been illustrated.

The resource persons we have brought will then answer your questions about this aspect of the uranium mine process before we go on to the next process. We have divided the uranium mining operation into the following phases, just so we can discuss part of the total operation at a time. Before we get into part two, we will have Mick Stuart stand up and give us sort of a broad picture of the Kiggavik proposal and then we'll go back into describing individual parts of the proposal.

The first discussion will be by Bernie Zgola. It will be an overview of the licencing procedures for uranium operations. Then after Mick Stuart describes Kiggavik in broad aspects and quickly, we will go into what buildings or equipment will be used at the mine, it's called the infrastructure requirements. That includes how they'll get the material there, the access, the winter road, the port and its location. Then we'll deal with the mining of uranium; whatever aspects you're interested in we'll get - you can ask questions of the expert or the resource person that we brought to the joint hearing. Then we'll deal with the ore processing, and we will talk about the tailings, how they dispose of tailings, what we can expect at the end. The next process we'll discuss is the water treatment, the water they use; how they recirculate it, where it ends up going. We'll discuss the transport

and use of the concentrate produced at Kiggavik. We'll discuss the monitoring and environmental impact, the system that will be set up to monitor the effect of Kiggavik on the environment, and we'll have examples of what was set up in Saskatchewan and what effects their monitoring program detected. And finally we'll discuss the abandonment and reclamation of the property, the site at Kiggavik - that's what has been done in other parts of the country and how it will be probably done at Kiggavik.

As I said, we are here to inform you and discuss uranium mining with you. We do not want to stand or sit here and talk to you all day, although we have enough people to do that. We want to answer your questions, so we have put in a lot of breaks. Between every one of these sections we will be taking a break and letting you ask questions on the topic. I request though that when you stand up to ask a question, you first of all ask all questions of the chair, which is myself. You ask no more than two questions before sitting down and letting somebody else have a go at it. You use - I was going to say you use the microphone, but we don't have one, so you'll have to speak loudly, and we'd like you to identify yourself before asking your question, so that when we produce a transcript we can tie down the questions to certain persons and it will make it easier for us to prepare the notes.

We will be preparing notes or a transcript of this meeting and possibly circulating it to other people in the Keewatin and Yellowknife if they are interested. This way, those people that could not be here will be able to read your questions and our answers to them. Before going on to part one, are there any questions at this time from the floor?

(INAUDIBLE COMMENT)

CHAIRMAN: I'm afraid not. We have a little problem at the moment

because of lack of equipment. As you can see, the English is translated but there are only 21 headsets. Hopefully by this afternoon we will have the simultaneous translation system set up and everybody can listen in both languages. At this point if you have questions in Inuktitut, Mikle will translate them for me.

If there are no questions, I'm either very clear or losing everybody. We will start talking about uranium and radioactivity while watching the video. The people that will be showing us the video and then discussing the basic concepts of radioactivity are Carmel Letourneau, a biologist whose position is health physicist with the Radiation Protection Division of the

Atomic Energy Control Board, and Mr. Bernie Zgola, who is the supervisor of the Uranium Mine and Mill Section, the Waste Management Division of the Atomic Energy Control Board. And they'll introduce themselves a little bit more when they do start talking. So at this point I guess we can all adjourn to the backroom, watch the video, have a coffee and then come back here in about fifteen or so minutes.

ADJOURNMENT

CHAIRMAN: As I said earlier, we'll have Carmel and Bernie continue this discussion of the basics of radioactivity.

MS. LETOURNEAU: My name is Carmel Letourneau. I'm a health physicist. Now that probably doesn't mean a lot to a lot of people. A health physicist is the person who studies the effects of radiation on living organisms. These people can be chemists, biologists, physicists and even engineers. Now in the film (few words unclear) at the centre, you're going to see a mine. There's uranium in here, it's radioactive, but it's natural radioactivity. In Canada one of the highest places of radioactivity is exactly where you are because of the type of rock that you have. So what does radiation do to my body? First of all you have see that there are two types of radiation; acute high level radiation will have an effect on a short term basis. That means that very high levels of radiation can have an effect within hours or within days. That's the first one. The second type is chronic low level radiation, and that's radiation at lower levels and you will have effects only way down the road, that is from 10 to 25 years, and the main effect will be cancer. Now, at the levels that we're talking about here, for this mine, it's chronic low level radiation, and the main effect that we would be looking at is cancer.

The effects that you hear about, radiation burns, vomiting, shock, all these effects happen only at very very high levels of radiation, and these levels can be encountered in an accident, for example at Chernobyl in the USSR when the firemen there got radiation burns. We hear about the bombing in Japan where also there are radiation burns. In the short term, within an hour, you can see the effects, but for our purposes here we're only talking about chronic low level radiation, and the expression of the effect will only be years down the road, from 10 to 25 years.

More specifically, what it does to your body. Now this big glob here is the cell. You have got millions and millions of cells in your body, and the round structure that you see in the cell, called the nucleus, is like the motor of a car or truck or your skidoo. That's

what makes the cell function. Now what radiation does - if you picture that nucleus like a big dartboard, and you have darts. Radiation is your darts which is going to the nucleus. Sometimes the dart will hit a very sensitive part of that nucleus; sometimes it won't. If it hits something very sensitive in the nucleus, then there's something wrong with the motor of the cell and years from when it hits that sensitive part of the nucleus, then you have a possibility of having cancer. So that means that if your friend is beside you and you're both in front of some radioactive source, he may get cancer and you may not get cancer. It's a question of probability. So that basically is the main effect that we're concerned with in the radiation section at these low levels of radiation.

The second question, you hear about genetic effects all the time. The question is how can my children not yet born be effected by radiation. Well, what happens is if the radiation affects the reproductive organs, there is a possibility again that the child will have an effect from radiation. This I must say has never been observed conclusively in humans. There have been a lot of studies done on flies, and mice, that do say yes, there is a genetic effect, or possibility of genetic effects from radiation. But from all the information we have to date there are no observable effects of genetic effects in humans. Because (word unclear) does show that there is a possibility of that, we do take into account the risk of genetic effects when we set limits for radiation.

The third question would be now, what are the effects to animals and plants? Okay, there's three levels of effects, the first one to the individual. When we talk about animals and plants, the value system is different. In radiation detection, we try to protect individuals of human species; every person, every worker, every family, individual in the family that has been exposed to radiation will be protected. For animals and plants it's a different thing. We don't protect every plant, every blade of grass - it's the population we aim to protect. And the effects that you see in animals and plants are the same as any stressor in the environment.

The three levels that you are is for individuals. You can have effects to cells - a lot of them we saw earlier - there could be some damage to the cells, to the blood, to the reproduction of some of these plants and animals, and also to the life span. The life span is not too much of a concern for animals and plants because biologically the purpose of their existence to produce, so if they don't live, if their life span is shortened as long as they consume it's not a major effect.

The second level is your population. At these levels, presently the releases from the nuclear industry into the environment do not affect to date the population. We've never encountered a population, or whole populations being wiped out from any release from the nuclear industry. Now, individuals - I personally haven't seen any of these - there is a possibility that there have been individuals that have been affected by releases from the nuclear industry. There is presently an international body of experts who are looking at this question. They have concluded that right now the releases do not affect the individuals and the population I have problems with that; I think that if it hasn't been decided yet, there may be individuals that could be affected. But right now the subject is still under study. We still haven't typified whether right now there are any effects on the individual from the industry. But, as I said, in ecology we don't protect the individual, like in the radiation detection for man, we protect the population.

The third level is the ecosystem. Very little work has been done. This would be protecting the whole unit (few words unclear) the environment. What happens is that before it reaches the level of the ecosystem you will see indications in the individual and at population levels.

The fourth question, I believe is how can I get exposed to radiation from the proposed mining operation. Okay, what you do is have some pathway - the routes of exposure. This is obviously not the pathway you will encounter up here. You will probably get caribou, lichen and dust (few words unclear). Releases from the mine, this is the main facility - is very dynamic, so eventually this will go to the environment and eventually will get to man, will get to the animals and plants. Now, from the facility you will have releases to the air. this will either come down when it rains, it rains: it drops. They're fairly close to the source. You also have releases to the water, that affects the fish and they eventually come up to the shoreline and affect man.

The fifth question, how does a city know that (few words unclear) environments are being exposed. Well, now this is complicated but it really isn't. This year the environment (word unclear) mining operation and all the way to right here when it gets to man. Now, all whatever is in the middle is the pathway, is the routes that these radionuclides get to man. Now for instance you have suspension in air, from the tailings you'll have dust coming, going in the air and eventually man will be inhaling this dust. You also have the water pathway that is being shown going into the surface

water from the run-off and then either going directly into the human by drinking the water or through the fish or anything else that one eats. For more specifics on this, Bernie will give us an idea of what the sources of radionucleides are for this particular area from mining operations, and we'll have examples of pathways in a bit more detail. So, Bernie, if you'd like to do that.

MR. ZGOLA: I think what I can do is show one of the overheads that Carmel had. By the way, I don't know if Carmel mentioned it in her introduction. Carmel is a biologist by training and school and she's been working at the Atomic Energy Control Board for eight years now as a house physicist. Myself, I'm one of those engineers that Carmel threw in at the end. I'm an environmental engineer by training and I worked in the nuclear industry for perhaps 11 or 12 years, and I've been with the Atomic Energy Control Board for nine years.

If you look at this - I must apologize for the fact that this looks like a reactor on the right hand side. Replace that building there with a mining operation, any uranium mine, and this is just a stylized picture graphically indicating how the stuff that comes out of the mine can find its way to the environment, and then finally to people on the shore of the body of water there. Now replace the cow obviously with caribou, and of course there are probably fish living in the water there. So, that sort of gives you a generalized notion. I will put this one up that Carmel had, and as she mentioned, this part here is what we call the source. In the picture that I had before the building, or the mine, etc., that source then gives or releases contaminants, radioactive or otherwise through various ways to these various receptors - things that receive the contamination - and pass it on.And these are basically of two types. They can either be carried by the water - Dr. Brunskill will talk about that - or they can be carried by air.

The types of sources, if you will, at a uranium mine that are of concern, and this afternoon people like Ron Barsi and Cliff Potter will be looking in detail at one of the Saskatchewan operations, but I'll briefly touch on it now, is number one, the mine itself, and the type of releases it can have is obviously the water that comes in contact with the ore. It can also release dust into the air, and it can release a radioactive component called radon gas which then changes to radon daughters. The mill where they take the ore and process it can release again into the air parts of the product, various sources in the process itself; dust, and again radon gas and its daughters. Also in the mill, of course, you have releases of contaminated

water potential.

When you're finished extracting the uranium from the ore in the mill, you have a solid product left. This product is called tailings, and you will learn more about this this afternoon. That is then taken to a controlled area, designed area, for storage of the product. It is taken there in a liquid form, a semi-liquid form. The liquid portion of these tailings, the liquid part, is taken off the tailings; it is contaminated as you can appreciate; it is then treated normally with a bunch of other water drawn from the mill or other sources. That is then the principal release from the mine of contaminated water. Before being released to the environment it is treated to meet standards established by regulatory agencies.

The other potential for contamination from the place where they keep the residue is the air pathway again. Remember we talked about water and air being the chief pathways. The air pathway again could be dust or radon gas and its daughters, principally, and we'll talk more about that this afternoon.

Having sort of given you an introduction to these pathways, what I would like to do, if Dr. Brunskill is prepared to talk about the water pathway, we can have him chat about the water pathway and then we'll perhaps have some questions.

CHAIRMAN: There are a couple of things - possibly before we have questions. I mentioned that we had representatives from a number of organizations, and I didn't introduce them at that time for the simple reason that I wasn't quite sure who they'd invited, and secondly some of them hadn't come in yet. I'd like to ask Mr. Jack Hicks with the KRC to come up and introduce the people that the native organizations have invited to attend the meeting and anybody else he recognizes in the audience. Jack.

MR. HICKS: I don't want to do that Pierre, because I wasn't asked to do that in advance. I would like to - I think people would probably like to introduce themselves. I would just like to introduce two people that KRC brought in. We refused to participate in this meeting unless we were able to bring in some of our own resource people, and these people will be, I'm sure, asking questions quite frequently, and I'd just like people to be aware that we brought them in because of their knowledge of uranium mining experiences and their technical knowledge. So if I could just introduce those two and then I would like to leave it to the Inuit leaders to introduce themselves. The two people we brought in are Professor Jim Harding from the University of Regina, and Paul McKay, who is a

journalist from Ontario. And I'd like to leave it to the Inuit to introduce themselves.

INTRODUCTIONS (IN INUKTITUT)

These are the mayors and their representatives. John Kaunak from Repulse Bay, and Paul Kaludjak is deputy speaker of Keewatin Regional Council, sorry, and their speaker - I should have introduced him first - Peter Kritaqliluk, Keewatin Regional Council, and Jackie Nakoolak of Coral Harbour, and mayor of Coral Harbour. TiTi Kadluk from Chesterfield, representing the mayor, Chesterfield Inlet. Tungulak Sandy from TFN. Donat Toolooktuk was unable to come, he had to go to Yellowknife yesterday. Thomas Suluk is coming in later tonight. He wasn't able to connect this morning from Eskimo Point, from the Keewatin Wildlife Federation. Andy Kautak came in but I don't think he's walked in yet, and there's young fellow from Chesterfield, David. Thank you.

CHAIRMAN: Shall we go on to questions on the basis of radioactivity? Anybody has any questions at this point? Yes, Chris.

MR. O'BRIEN: My name is Chris O'Brien from Yellowknife. In the movie video the guy with the white coat said that - I don't know if I got this right - but over the years studies have shown there's less and less concern about exposure to radiation.

MS. LETOURNEAU: No, no, I don't -- what happened was at the beginning they said you can't feel it, you can't touch it, you can't see it. They didn't know a lot about radiation, so they were working with radiation not knowing a lot about it and touching sources and they would get burned and all this business. Over the years, because of sophisticated equipment, we learned more and more about radiation and we put in place radiation protecting practices at hospitals and places where you would have a possibility of getting effects from radiation. So right now because of those practices, the chances of getting burned in an x-ray clinic are very very small. So I think that's the point he wanted to put across.

MR. ZGOLA: I think perhaps the other point they wanted to bring across is that if you look over the 90 or 100 some-odd year history of radiation, the regulatory limits set by regulators have dropped, have become more and more stringent for people who work with radiation, and he passed on to the other point that was trying to be made.

MS. LETOURNEAU: Yeah, the limits themselves have dropped but there's also the principle that he talked about in the movie that you want to keep doses as low as reasonably

achievable. Now, in the past you didn't have that principle; now we're getting into that so again the effects of radiation are of less concern because we know more about radiation than they did 'x' numbers of years ago.

MR. O'BRIEN: Yeah, that's the impression I got from the first doctor with the white coat. My understanding is that in fact the limits are being lowered all the time, because some people in their studies are saying that even the present limits are too high and that the limit should be lowered.

MS. LETOURNEAU: Okay, right now there's a lot of - if you're familiar with the Japanese bomb data - they're looking at that again; they're looking at the risk associated with the observed. The limits presently haven't changed, five millicuries for members of the public and 50 millicuries for (word unclear) occupation. But the risks are being looked at right now. With advances in science, it's possible that, because we know more about radiation, that either the limits could go down or the limits could go up. It's not something that's carved in stone. So 50 years ago same thing, they didn't know a lot about radiation, they set limits; they found out more about radiation; they thought that those limits were inappropriate; they changed them. So it's an ongoing process.

CHAIRMAN: Yes Mr. Harding.

MR. HARDING: It's a question of the same thing, except the movie. I do have (few words unclear) in the video is, as radiation goes down, the risks go down. Now my understanding is that the movie was made ten years ago. Since 1925 the permissible levels of radiation have been dropped by 55, and last year, 1988, British regulatory bodies have reduced permissible levels by another two thirds. Canada has not followed suit but will I suspect be forced to by the International Commission. The reason why Canada hasn't followed suit is that it will be difficult to maintain mines and existing reactors if the levels were lowered. So I want - I think people have to understand that we're talking about the (word unclear) levels, we're not talking about the scientific levels. Low level radiation is now considered to have a greater health risk than higher levels. Very high levels can kill cells. Very low levels can damage them so that some people develop over long periods of time. My question is why do they select a movie for information that is ten years old, that says nothing about how many background radiations has in fact been added to. It makes it sound like it's all natural. The background radiation has been constantly talked about as though

natural is nothing to worry about, has been added to by (word unclear) tests, by uranium mining and milling and by the nuclear power base, by the whole uranium industry world wide raising the levels of radiation for exposure. There's nothing natural about it any more than, you know, if the ozone layer, there's a hole in it, it's natural that there's ultraviolet radiation. That you get skin cancer comes through the hole is irrelevant to this matter. I think that - my question is why do you pick such a biased movie that is so outdated on the levels of radiation.

MS. LETOURNEAU: Okay. The first thing is the movie is ten years old. The main concepts that were presented in the movie are the same. Now perhaps the numbers of risks may have varied a little bit, but I don't think in the movie they actually presented any number of risks. What you're saying (inaudible)-- Okay, what the movie says was if you lower your dose the probability of getting cancer will be lowered, okay. Now this is the work that we use for radiation testing practices. Scientifically you have, at very low levels, it's very difficult to get that, so you have to speculate at those levels. So what you do is there's a theory that says that lower levels the risk is actually lower than if you have a high level. Now there's another theory that says that at lower levels your risk is going to be high. That theory has not been scientifically accepted. There are some studies that indicate that you have sub-populations of people who are very very sensitive because they're diseased people, or (word unclear) that cannot cope with radiation the same way that normal people would do. But that's not something that is accepted but a couple of studies have posed this particular theory. So in general it is correct to say that if the dose is lower the probability of your effect is going to be lower too. So in the film what he did say was correct.

Now the reason why we presented this film was that we heard that here and at other places there was a fear of radiation, and what radiation is, because, you can't smell it, you can't touch it. This produces naturally a certain fear in people. So in trying to address the fear, the film presented, the main point of the film was that this was not something artificial. We have lived with radiation since the beginning of time and proof of that is that within those cells, that big of glob of cell that you saw, there's certain pieces of that cell that their only function is to repair damage from radiation to the cell. So that evolved, that mechanism evolved because man has been living with radiation since man has been man. So radiation is a natural thing. Now, releases from any mine or the power plant (few words unclear). The point was that radiation is not something necessarily feared. You

have to have a healthy respect for it, understand it, so that was one of the reasons why we presented that movie.

(end of tape side #1)

MR. ZGOLA: ... and I think he mentioned England, that the limits were lowered by 60 percent, two thirds or whatever. We, at the Atomic Energy Control Board have advisory committees and the Board has staff that are experts in this business of dose . We talk about dose (word unclear) as if everyone understands it. I think it's time we explained a little bit more simply what dose means. Dose simply means how much radiation you get. So from now on when you hear dose, it means how much did I get, how much radiation did I absorb. Okay, having said that, we have limits here in Canada for the amount of radiation, the amount of dose that you can receive. Those limits we can discuss, and we can give you the numbers for it, but I don't think at this time it's relevant. What I can tell you is that of all the uranium mines operating in this country, the dose limits for the workers set by the Atomic Energy Control Board, the workers average about ten percent of that dose. And the theory is, obviously, that you keep radiation exposures as low as reasonably achievable. You may have a limit of five, which no one can exceed in one year; however, if you take the 500 miners that work at a particular mine, their average would be point five, or one tenth of that limit. So I think it's important to make that point to put what Dr. Harding has said in perspective. Thank you.

CHAIRMAN: Yes Mr. Harding.

MR. HARDING: (few words unclear) there are no two scientists who can agree (few words unclear). The point I want to ask you is what happens if you exceed that level presently set by Atomic Energy (word unclear). What happens if the present theories are wrong and that we can't -- what is an effect of radiation. What happens if you exceed present levels for long. What would be the effect of this radiation (few words unclear). You know, we get radiation from the sun, and natural sources (few words unclear) but for those of us that (few words unclear) we got more concerned about it, so I want to ask you, is there nothing wrong with the effect of radiation (word unclear).

MS. LETOURNEAU: Okay, right now as Bernie just said, the limits that we're talking about for members of the public is five millicuries per year. It's a certain level that is based on an acceptable risk that society has judged to be acceptable. That level isn't arrived by ECB. The International Commission of Radiological Protection looked at the risk of other industries, compared them,

and came up with a dose factor of five millicuries per year. Now, what happens if you go above that? It doesn't mean that if you're at 5.5 you're going to get cancer. It means that the probability of you getting cancer is a bit higher. Now the risk at that level has been judged to be unacceptable by man in general, by the industry in general, because the risk was looked at in different countries, for example the occupational risk that people would take working in a mine, or working in an office, and they looked at the average and came up with a certain risk factor and then they derived the dose of five millicuries. That is the acceptable risk that everybody is willing to take. If you go above that, as I said, you're not going to get burns, you're not going to get anything, or we call non (word unclear) effects. Those are effects that happen only at a higher level of radiation. Now, like I said, if you go above the five, your risk of cancer is increased a little bit. The limit is five, and if an industry goes above five the directive would be to bring it down below five. There's no reason, no economic reason, no social factors that the company could bring up and say well we (word unclear) above five. That's all. It has to be below five millicuries.

MR. ZGOLA:

As I said I'm an engineer with some knowledge. We have yearly limits for exposures for workers. If a person was to exceed - let's say the limit is five, and let's say your chance for cancer, if you've got problems, and as I told you, you run one tenth of that normally. The average miner runs one tenth of that. But let's say the limit's five; you have a risk of cancer of one in ten thousand. Does everybody understand what one in ten thousand is? Okay. How can I explain. Okay. If you flip a coin, heads or tails is one chance in two. It either can come heads or tails when you flip a coin. So if I say what is my chance of getting heads, it's one in two because it could be either heads or tails. So when I say that you have statistically a one chance in ten thousand of developing cancer that year if you got five millicuries, and I'm not saying that that is the chance. Obviously if you got a little bit more you, would have one chance in nine thousand. Does anyone play the lottery here? Okay. But what I'm saying is that those are statistical samplings. Now, having said that, that's a yearly limit. if a miner works for twenty, or thirty years, his exposure will vary. One year it might be one, next year it might be half, the following year it might be four. So we're saying over an average working lifetime again, although a person might get five one year, he might get only one or half the following year. The companies are monitored extremely closely to ensure that no workers are over exposed, they're monitored by many agencies to ensure that that doesn't happen.

CHAIRMAN: Mr. Hicks.

MR. HICKS: (few words inaudible)
I guess the first point I want make, I think it's obvious it didn't come across in the answers to Dr. Harding's questions. When you talk about health risk and radioactivity, you're talking about bioaccumulation. How much you build up in your body over a period of time. I've not heard that but it came across very clearly. I agree that we shouldn't try and play numbers games because numbers are strange things. You can bend them just about any way you want to prove anything you want. I'd like to show you examples of some of the numbers games that the Canadian government plays.

This is from an Environment Canada publication showing levels of radioactivity in air, precipitation and milk, from 1950 to 1988. There's really nothing wrong with those numbers. They're presented an odd way of presenting numbers, called a log scale. What a log scale does is make small numbers look big and big numbers look small. This is done sometimes so they fit on the page. If you grab the same numbers out so that each number is given the same size the way you would normally do it, what we find is that because of (few words unclear) were testing and followed in the environment, there was an incredible amount of radioactivity (few words inaudible) causes during those years. (few words unclear) you don't get that working a test case. You get it from data. They're the same numbers. This one is just a straight forward display. This one is a mathematical way of comparing large numbers with small ones. We know that - this is just a page from a study where people sampled life in another, other points in vegetation from Winnipeg up to (word unclear) in a straight line up the middle of Canada. What they found out was that for that various reasons there were higher levels of radiation sticking around in the Keewatin and south Baffin, and northern Quebec area than in other parts of Canada. There are reasons for this but that's a fact.

Where we get into the politics of what is safe and not safe - I'm really sorry I can't put these up on the screen for you. I'm sorry I can't put this up on the screen. This shows what in 1986 was the World Health Organization's acceptable level for radiation in food, in meat, sorry, 200 becquerels per kilogram. Anything above that they said is just not healthy for you, especially if you're people who eat a lot of meat. That's 200. In 1987 the European Parliament recommended for milk that it be reduced to 125. At the same time they reduced it they recommended that everything except meat be reduced to 100, and the European Parliament's (all the different countries in Europe have one parliament where all the countries go to) -- they have an Environment Commission. In June 1987 they recommended that all foods - milk, meat, chocolate bars, everything - be reduced, that the acceptable limit - it's a political term, - be reduced to 5 to 10.

In 1986 the Canadian guideline for meat being brought into the country, ie what was acceptable, was 300 becquerels per kilogram. When, after the Chernobyl explosion, they measured caribou in March of 1987 from all across the north, there was a big range in the numbers. Some caribou only had 200 becquerels per kilogram; some had 1400, and the Canadian

National Health and Welfare people all of a sudden proposed that the acceptable level for radiation in meat grown in Canada, not brought into Canada - like caribou that are raised in Canada - be raised more than ten times to 3500. Some scientists who were critical of the way these people operate said, why would you do that? Why would you raise the acceptable level to twelve times higher than it was last month? The obvious answer is, if you don't set the acceptable levels higher than the tests you're getting, then it's in a sense unacceptable to eat caribou, and we couldn't have that, could we. I just want to make it clear that I think Jim was right. The levels of what is healthy and not healthy to eat - did anybody ask an Inuk in the Keewatin if they wanted the acceptable levels for meat raised twelve times? Society did not ask to have the number raised. The Canadian government did, and you have to ask why.

CHAIRMAN: Thank you Mr. Hicks. I like the fact that the graph does show that the radiation has decreased at this time. I don't think -- Was there a question Jack, did you want to make it into a question or were you just making a comment?

(INAUDIBLE COMMENT)

MS. LETOURNEAU:
I don't understand what the point was, (few words unclear) numbers and I know Health and Welfare are familiar with the numbers because Health and Welfare were responsible for deriving those numbers, and I got a chance to look at the methodology that they used to do all the numbers. For years and years the methodology didn't change, and it was very - their (word unclear) point of risk also was very different from year to year. Throwing out a bunch of numbers without knowing the changes in methodology and the risks - I don't know what exactly your point was but it's a very complex issue. I'm confused, and if I'm confused I think maybe some other people might be.

MR. HICKS: Let me try and sum it up. What I was saying was that I think it was only two or three weeks ago that there was a scientist here in Baker Lake continuing to study the question of what happens to people's health because of the rise in radiation in caribou. The point is that we don't know, right, that's the point. You yourself said the methodology is a game more than a science. The question is why was - what reason could there be for raising the acceptable levels for food twelve times higher overnight without any kind of public input into that process. What does that mean about how much we really know about radiation? Just last December we found out that

we're getting pollution from the Soviet Union, PCB's, an indication of Soviet (few words unclear) by snow. We don't know what that's doing. I eat caribou. I don't know what that's doing to me. Just this morning they were talking about the breast milk study in Broughton Island. They're not releasing the data for another week or two. What they did say is they're finding extremely high levels of PCB's in breast milk, mother's breast milk in Broughton Island. And that ground, you know there are nice pretty pictures that movie showed. It's all this stuff and we really don't know what it all adds up to over time. That's the point I was trying to make.

CHAIRMAN: Okay, thank you Jack. I guess I can make a comment at this point, maybe. I think we're sort of getting sidetracked from the concept of what's uranium mining and the effects on the environment. I realize there are other things that are affecting our environment, there are other sources of radiation, Chernobyl being one, atomic tests being the other, but we'd like to restrain ourselves and deal directly with the effect as we understand of uranium mining.

MR. HICKS: I'm sure you would. I'm not sure we should.

CHAIRMAN: Okay, you're not sure we should. The problem is that the resource persons we brought are considered experts in the field of what the effects of uranium mining would be. Long range transport of pesticides is not, and I don't think anybody here is an expert on it nor is there a resource person that is knowledgeable enough about the transfer to follow your questions on that point, including Chernobyl and such as that. Sir?

NEW SPEAKER:
I have a question in regards to the video that we saw, the movie.

CHAIRMAN: Okay, can I ask his name?

NEW SPEAKER:(translated)
Pilakapsi, President of KIA, and I have a question in regards to the video movie that we saw. I enjoyed the video movie very much but I was just wondering whether that was a (word unclear) made movie and I was just wondering if we're going to be seeing any movies or video movies in regard to what's happening in the North. It's very different from what's happening down south and very different from what was happening in the North, and I would like the people of the communities to find out really what would be happening here in the Northwest Territories rather than seeing movies that are made down south and coming from down south. If I'm in too much of a rush

to ask for something like that, I'm sorry, but we would like to know.

MR. ZGOLA: I think that both Carmel and I have indicated that the movie is not the best movie that could be brought up here. I wish we had the time and the resources and maybe we can co-operate with other agencies to prepare a movie that would be strictly about the North and would (few words unclear) what goes on here in the North. However, having said that, what we felt the movie would do would be to give you the basic concepts. You know, the little atom going around and electrons going around and somebody showing you that a book would stop this type of radiation etc. I agree with you that, and perhaps I'll even agree with Dr. Harding, that some of it was a little bit of propaganda, okay, and I'll go on record saying that. But having said that, I think you can't dismiss the good parts of the movie. Now, that's the movie. We're here I think for two days to try to explain to you with our knowledge of what we think the effects of a mine, a uranium mine in the North would be. And you are here to make damn sure that you don't let us go away without explaining this to you. If you do, I think we've all wasted our time. It's a small community. If your questions are not answered here whenever this ends, I'm at the hotel across the way. Come and talk to me. Come and talk to Carmel, or anybody else. And I think that's all I'd like to say about that now.

MS. LETOURNEAU:
I'll just add one thing about propaganda. I teach radiation detection to lab people and I've been looking for films on the radiation sections that are not biased, that would not be produced by companies, that would not be produced by OCTTA or NRC. The only people I see that could produce an unbiased film would be at the universities.I have never seen a film produced by any university. So as a teaching tool, you know, we try to get a film which is as unbiased as possible. If there are any - if Dr. Harding knows of any film that is unbiased, I'd like to know about it.

MR. CURLEY: (inaudible)

CHAIRMAN: I'm not sure what you're getting at Tagak.

MR. CURLEY: Well, the gentleman has said if you want to talk to me about the questions about acceptable levels (inaudible).

CHAIRMAN: What it is, they're the ones who set the levels; they're the ones who make sure that the company follow the levels, that the maximums are not

exceeded. They're the people that regulate the uranium part of uranium mining. You're right, DIAND will have a part to play in the regulation because we will have to issue land use permits, water licences, land leases. But we do not - we will not, I think, deal with the uranium or atomic, radioactivity parts of the operation. These ladies and gentlemen will be doing that. Because their mandate is to do that across Canada, all the mines have to live by the standards set by the Atomic Energy Control Board of Canada. That's their business. That's why they're here; that's why they're answering questions on radioactivity, because they're the experts in that field.

MR. CURLEY: (inaudible)

CHAIRMAN: In what way do you want us to deal with the policy, Tagak? I mean the fact is these people are going to be regulating the uranium industry whether it's here or in Saskatchewan. They will have a say in how it's regulated. Now in Saskatchewan, and probably in the Territories, there's a joint undertaking with the Department of Environment of Saskatchewan and probably Renewable Resources in the GNWT, but these are the people. And we will be talking in more detail about this this afternoon. Bernie will come back and answer this question. Do we have any other questions at this point, or we could go on to Dr. Brunskill and his description of the movement of contaminants in the water system. Dr. Brunskill, it's all yours.

DR. BRUNSKILL:

Hello. I'm from Fisheries and Oceans, and my research has been on the chemistry and biology of the lakes and the inlet at Saqvaqjuac. Some of you from Chesterfield Inlet and Baker Lake will know of our camp and our work there. I have worked with Buster Welsh and his group. We have studied the plants and animals in the lakes, and chemistry of the water and the mud at the bottom of the lake. We measured how fast dissolved salts and particles go into the lake from snow & rain & streamflow, how long they stay in the lake, and how much goes out the outflow.

We have also done experiments on the Saqvaqjuac lakes, by adding nutrients to the lake water to see if the plants and animals and fish grow faster. Sometimes if you add too much nutrients, the water goes bad and it kills the fish food creatures and the fish. Dr. Welch pumped methane into a lake to see what would happen if a natural gas pipeline broke in a river or lake. We use very small amounts of radioactive elements to learn about how the lake

water moves, and how fast plants grow. We have measured the very small concentrations of the natural radioactive elements (uranium, thorium, radium, lead, polonium) in the streams and soils of the land, the water in the lakes, the fish, the mud at the bottom of the lake, and the lake outflow, so we know pretty well how these natural radiactive elements behave in Saqvaqjuac lakes. We have also measured the concentrations of pollutants in Saqvaqjuac mud and fish that come from the big cities & industries down south, such as DDT, PCB, lead, mercury, and cadmium, and nuclear bomb and reactor fallout Cs-137.
We think that the lake chemistry and biology (plants, animals, and fish) of the Saqvaqjuac area are similar to those of the Kiggavik area. It is not exaclty the same, but the two areas are similar. We think our results can be used to talk about what might happen if they developed a uranium mine at Kiggavik.

I have read the general proposal for the Kiggavik uranium mine, and I think that you people should worry about the following things in the Kiggavik area, perhaps 5-8 lakes downstream from the effluent waste pipes:

1. Acidification of lake water: Large amount of sulfur will be made into sulfuric acid at the mine site. Some of this will get into the air and make the rain acidic, and this will affect the lake water. In the southern Canada, we know that acid rain decreases the abundance of fish food animals, and causes a decrease in the growth and abundance of fish. Sulfur will also come from some of the minerals in the ore. Acid can be neutralized, or made less harmful by adding limestone to the water.

2. Adding too much nutrients (sewage) to the lakes will cause the plants to grow too fast, and this will take all the oxygen out of the water during winter's ice cover. Over 150 people will be living and working at the mine, and the waste will go into some pretty small lakes. In a different way, this is also good, because lots of plant growth will help remove the metals and some of the radioactive elements form the lake waters.

3. The effluent waste pipe will deliver lots of trace elements (lead, copper, zink, cadmium for example) in the water and in particles in the water. These elements are from the water and in particle in the water. These elements are from the uranium ore, and they will sink into the mud of the downstream lakes pretty fast, as long as the water is well mixed and doesn't loose all the oxygen in it. If too much of these elements get into the fish, they will not be good to eat, and they will not be healthy. The waste

pipe water will also contain other chemicals (sulfate, salts, organic liquids) added by the men in the mine mill to get the uranium out of the ore. Some of these chemicals are harmless if the water is well mixed and keeps getting oxygen from the air; but if the water and mud doesn't get enough oxygen, the sulfate will be reduced to hydrogen sulfide, the stuff that smells like rotten eggs. If you can smell hydrogen sulfide under winter ice, usually all the fish will be gone from the lake.

4. Frozen ground and changes in water flow rates: If there are thick layers of loose sand, gravel, or boggy mossy areas above the hard rock, this material will usually have lots of ice in it. Normally this ice stays frozen year around, but if the surface of the ground is disturbed by buildings, roads, trucks & tractors, or flowing water, the ice will thaw and the ground will turn into soup in the summer time. The fine particles in the thawed ground will flow into streams and lakes, and over up spawning areas and clean gravel regions of lakes that are important for fish. The proposal indicates that lots of water will be bumped out of one lake, used in the mine, mill, and for domestic consumption, and flushed out the effluent waste pipe into a different, probably smaller lake. This will change the flow rate of water in lakes & streams below the effluent waste pipe, and will cause increases in water level and flow rates in the winter. This may thaw nearby frozen ground, and result in the addition of lots of fine mud to the lake (thermokarst slumping).

5. Uranium and its daughters, the children of uranium. We measured the very low concentrations of uranium, thorium, radium, lead, and polonium nuclides in soils, rain, snow, lake and inlet waters, and the mud of the lakes and the saltwater inlet near Saqvaqjuac. We did these measurements because we wanted to understand how these radioactive elelments move through the streams, lakes, mud and the saltwater estuary. These nuclides are useful in our research to heop us understand the chemistry and biology of natural lakes, sand they are "friendly radioactive elements", not something to be afraid of. There is no pollution of Saqvaqjuac lakes from mines or towns. We can detect some of the radioactive nuclides from bomb explosions back in 1958-64, and these low concentrations are useful in our research and they are not a health hazard to fish or to people.

Our studies show that about half of the uranium, thorium, and radium that comes into the lake (from rain, snow, & stream runoff) goes to the mud of the lake and stays there. The other half goes out the

outflow and on to the next lake. The other daughters of uranium, lead and polonium, stick to particles in the water and 90% of the year's supply is trapped in the lake mud, allowing only 10% to go downstream. I think that this will be roughly true for the radioactive elements that come from the Kiggavik mine waste effluent pipe. Therefore, as the mine waste water flows down a chain of lakes, each lake will take out at least half of the radionuclides that come from the mine waste. Lakes that are small & shallow will be less efficient at trapping these mine radionuclides, because the water will flow through the lake faster. Increasing the water supply rate to a small lake will have the effect of decreasing the fraction of the nuclides trapped by the lake sediments, and increasing the fraction that is passed on downstream to the next lake. If you were to somehow stop the supply of natural nuclides to the lakes, uranium and radium would stay in the water for 1-2 years, whereas thorium, lead and polonium would disappear in 1-2 months.

We have measured the natural concentrations of uranium, thorium, radium, lead, and polonium in Lake Trout, Char, plants and small animals in the Saqvaqjuac lakes, and the cod, seals, bear, and some birds that live around the saltwater inlet. We have found that most animals concentrate uranium, thorium, and radium in their body parts 10 to 100 times the concentration in the water that they live in. Lead and polonium are bioconcentrated by animals 100,000 to 1,000,000 times the concentration in the water. I would expect these concentration factors to be similar to Kiggavik lakes and their animals & fish.

NEW SPEAKER: ... fish will eat them.

DR. BRUNSKILL: That's correct.

SPEAKER: And fish will get lead (few words inaudible). Studies have been done on that.

DR. BRUNSKILL: There have been many studies on the food chains of the fish food plants and animals, in the Arctic and elsewhere. There have not been so many studies on the concentrations of uranium series nuclides in food chains. We have done some of this kind of research at Saqvaqjuac, on lake trout, char, plants & animals that swim in the lake water, and animals that live in the lake mud. We have also done a little work on the saltwater plants & animals that live in Saqvaqjuak inlet. Since we know the concnetration of uranium series nuclides in the water and the plants and animals, we can calculate the "bioconcentratin factor", or how much the plants & animals concentrate

in nuclides above the concentration in water (on a weight/weight basis). These levels of radioactive elements in Saqvaqjuac lakes are all natural. At Kiggavik, lakes downstream from the mine waste pipe will get at least a thousand times more of these radioactive elements in their tissues.

NEW SPEAKER: If you're interested in these studies, the ECB has produced a document on exactly that subject, so I could send you a copy of that.

NEW SPEAKER: I'd just like to get a rough idea of what will happen to the fish in the lake downstream from where the tailings will be. I thought he said they will increase the bioconcentrate, the amount of radioactive materials (few words inaudible). What will the fish in the ponds downstream of the tailings pond be like at the time it's been there for five years. (few words inaudible) will it be safe to eat or not - that's what I don't understand.

DR. BRUNSKILL:

You are asking for a lot. I would like to know that as well. All of this depends upon the rate of discharge of water and nuclides from the effluent pipe, and how much per day in the different seasons, the wolume and shape of the lakes,and the kind of mud at the bottom of the lakes. If you have a chain of lakes, connected by streams, and the natural water plus the mine waste goes down this chain of lakes, the lake near the effluent pipe will have the highest concentration of the uranium series nuclide will decrease. Uranium and radium will go the furthest downstream, because they stay in the water longer. Thorium, lead, and polonium won't go very far downstream, because theys stick to particles and sink to the mud at the bottom of the lake very quickly. Again, lakes that are small and shallow will not be very good at trapping these nuclides in the mud, because the water flows through the lake more rapidly, compared to a larger, deeper lake that keeps its water in the lake basin longer. For the small lake chains in the vicinity of the proposed Kiggavik mine & mill, I would guess that it would be difficult to detect Kiggavik nuclides below the sixth lake. The levels of uranium series nuclides in the fish in these lakes will be increased in proportion to the supply rate of Kiggavik mine effluent.

Studies have been done in mine tailings effluents all over the world, and it has been very difficult to determine if there was any effect of these nuclides on the fish. If the mine were to be developed, I would not hesitate to eat the fish from Judge Sissons

Lake. I think you should be more concerned about the other mine wastes that are more abundant and will go down the lake chain faster and farther. Pollution from non-radioactive metals, sewage, sulfate and acid, and permafrost melting is likely to be more important to fish and people.

MR. ZGOLA: Yes, I think Dr. Brunskill has said just about everything. I just wanted to add that we'll talk this afternoon about the monitoring programs that are set up in operating uranium mines to ensure that the types of things that Dr. Brunskill talked about, ie that the fish don't suffer undue stress, that the fish don't accumulate enough of these radionucleides so that if humans eat these fish in reasonable quantities, that they do not run an inordinate risk, unacceptable risk, of harm. The other thing that I'd like to note is I'd like to echo what Dr. Brunskill has said. We normally conduct toxicity tests with fish in uranium mine effluents, and in some cases, especially if ammonia is not used within the mill, the standard toxicity tests done for the most sensitive species of fish, which is a trout species, involves taking these fingerling trout, throwing them into mine effluent for 96 hours, and looking at what the survival rate of these fish is. As I said, by and large if the mill doesn't use ammonia in the effluent, which I suspect is going to be the case in the Kiggavik project, the fish will survive. In other words, they pass the toxicity test. Any long term bioaccumulation of radionucleides, as Dr. Brunskill has indicated, will be much sooner harmed by pH variations, by ammonia, by conventional pollutants, and when I say conventional, you may hear that term over the next day or two, that means non-radioactive, that are associated with that mine.

NEW SPEAKER: I just came back from a two week research trip in southern Canada and one of the things I was trying to come by was the scientific studies that have been done not in the laboratory but on wildlife, fish and mammals near uranium mines, what's actually proved not in the lab, but measuring what's happened. I guess there are two parts to this. First of all, I asked a number of people in northern Saskatchewan what do hunters and trappers in northern Saskatchewan think about the effects, and the answer that I got was, they don't know what to think, because they're not satisfied with the level of independent scientific study of the kind that Dr. Brunskill has done. They said they get a lot of government people coming through throwing fish in tailings ponds for 96 hours and they really don't accept that. What they want is independent studies. It's interesting, because they've been mining uranium in Saskatchewan for 30 years, yet people aren't satisfied with the

research that's been done. The best person that I got scientific information from is a woman named Stella Swanson at the Saskatchewan Research Council, and this diagram is from something she published last year that shows how radionucleides work their way through the system, and I'm sure Dr. Brunskill knows Dr. Swanson, and I agree that radionucleides aren't the only problem.

This is something that's just coming out this year from Dr. Swanson. What she did was to go downstream of the Beaver Lake uranium mine, and she took out a bunch of adult fish and compared a number of aspects of those fish to fish that came from waters that were nowhere near the uranium mine. What she found out was that they had very high levels of white blood cells, a high white blood cell count, low red blood cell count, and low blood cell pack. I don't even know what that means. I asked her what does this tell us about fish near uranium mines. She says, to her as a scientist it (end tape side #2).

... I think it is false though, to say that there's going to be no caribou downstream of these things, or radionucleides in food chains, terrestrial animals and things like that. Extensive research on the Alaskan coast was done during the 1960's. There are probably walls as long as that wall there full of books and transcripts of U.S. Atomic Energy studies (word unclear) as the result of bomb fallout studies in the north. The U.S. is concerned about the Eskimo (few words unclear) being contaminated from bomb fallout through the lichen, caribou, man-food chain. Probably billions of dollars were spent on those studies and some of them are very (few words unclear) Finland, Sweden, Norway, and I would say it would be as good a science study as Saqvaqjuac for the purposes (few words unclear) I would say as those studies are to northern Saskatchewan.

NEW SPEAKER: My question, what does it mean work hasn't been done in Saskatchewan on the caribou, on the fish - I realize the kinds of points you're making (few words unclear) I've seen those wildlife studies myself. What does it mean that work hasn't been done in Saskatchewan. Now a lot of this workshop is going to be in reference to Rabbit Lake and how safe it is and how things have gone on there. What does it mean that we don't know what's happened to wildlife (few words unclear).

NEW SPEAKER: In some way it has to work. It doesn't imply (few words unclear) that's probably monitored. Do you mean that people haven't monitored the caribou, or do you mean that people don't understand how much radium goes through lichen and caribou food chains.

SPEAKER #1 Either. I'm asking, I mean I'm sure there are people hunting caribou and there's a number surviving - I'm sure Louie(?) knows this a lot better than I do, I think the numbers (few words unclear) and I know there's scientific data on how radionucleides work their way through the food chain. What I'm asking is why after 30 years of uranium mining in northern Saskatchewan when I go up to people in Walsh Lake(?) or Lac LaRonge and say what do you know about what is actually happening to the animals that you eat, they say nothing.

(INAUDIBLE COMMENT)

MR. ZGOLA: I'd like to put into perspective the 30 years that you're using. There's one mine that operated for 30 years that has now been decommissioned. The other mines, particularly the Rabbit Lake mine, started operating in 74-75, that's more like 15 years. The other thing is, there are limited funds available for research to any research organization, including my own, including organizations such as Saskatchewan Environment, etc. Where these funds go is where the scientists perceive the greatest need is. Now, I can give you - I'll discuss that later this afternoon when I talk more about pathways, but just so people don't leave with the wrong impression, there was a $50,000 moose study, for instance, done in the Elliott Lake area where the mobilization, if you will, of radionucleides has probably a greater potential for that happening than at Rabbit Lake. I can discuss the type of results that the moose study gave us. There have been fish studies done in various locations of uranium mines, and we are going to be doing another one as well this year in Elliott Lake on thorium build-up in fish. So to say that there is no work done on uranium mining in Canada, I think is unfair. I think there is work being done; whether it's enough is a value judgment by anyone.

NEW SPEAKER: Two points. I didn't say that no work has been done in Canada; I said in northern Saskatchewan. (few words unclear). The second point is this business of limited research is a pile of crap. There's unlimited amounts of money to hold hearings; there's unlimited amounts of money - what about the toxic waste plant in Ontario, there's 75 million invested in the environmental impact statement. You feel good telling me that that's a rational argument, or that there's not enough money left over at the end to do a wildlife study?

MR. ZGOLA: I don't make decisions on the availability of money and we could debate over lunch whether it's wise to spend a billion dollars on high level research or

whatever. I don't make those decisions. I'm making a statement of fact. Policy makers, senior bureaucrats, politicians, make decisions on where the resources of a country go. I'm telling you the result is that the amount of moneys available for research into the effects of uranium mines, although it is high, it is perhaps not high enough. That's something that I personally can't do anything about.

CHAIRMAN: (words inaudible)

SPEAKER: ... clarification (few words unclear) in Elliott Lake the potential of mobilization - what's mobilization?

MR. ZGOLA: Mobilization - I'm sorry I'm using terms that are probably not understandable. Mobilization means that, as Dr. Brunskill was saying, either chemicals or radionucleides, be they in the sediments or in the rock, is how they become available to the environment. In other words, are they easily going to go into this food chain, or do they sit very comfortably in the muds? Are they easy to remove from the tailings or do they sit there comfortably and don't move? That's what I mean by mobilization. If you have an acidic situation, as you have in Elliott Lake, certain of the contaminants are more easily made available to food chains, than if you have a neutral type of environment as you have in Rabbit Lake.

CHAIRMAN: We will be coming back to pathways with Bernie this afternoon so maybe we can call it quits now. Come back at 1:30.

SPEAKER: I'm from Saskatchewan. I have looked at the research in northern Saskatchewan. I think there is an answer to the question, why there is so little known. I have a letter with me from the past mayor of Pine House, which is a community which is closest to the largest uranium mine in the world. I've worked with the Saskatchewan Association of Northern Governments, and it's a common feeling among the mostly Métis and non-status Indian communities, and I am reporting quite accurately, that they believe because they are native people the area has not been studied as thoroughly as say northern Ontario where there are white, immigrant Portuguese and other communities adjacent to the Elliott Lake mine. They have a lot more political clout. A past prime minister of Canada came from that area, Lester Pearson, so they believe there is a political reason that there hasn't been much studying done in northern Saskatchewan. The other thing is, we've got to be quite frank that uranium mining in Saskatchewan was originally cloaked in secrecy because uranium was produced for nuclear weapons. The history of the mine was to produce

weapons-grade materials for the United States and United Kingdom. So none of us - I grew up in Saskatchewan - we did not even know until the late 60's and early 70's and 15 years after it had been done, that there had been mining in Saskatchewan to produce nuclear weapons in the United States. The secrecy was clearly part of why research wasn't being done. In the States now they are doing research where there is waste, high level waste from nuclear weapons production. Thirty years after many of the weapons were produced, they are finding higher cancer rates in the communities living around the waste disposal areas. I saw on television last week, and it's now coming out in public, it was also cloaked with secrecy. So these, I think are reasons why Saskatchewan is being ignored. I'm reporting really what a lot of northerners feel, that a study hasn't been done there for primarily political reasons and military reasons.

CHAIRMAN: Thank you very much. A point that was brought up to me is that one of our prime ministers was from northern Saskatchewan which means - Diefenbaker was from northern Saskatchewan wasn't he?

SPEAKER: No, not the (few words unclear).

CHAIRMAN: Close enough.

MS. LETOURNEAU: Prince Albert is the northernmost part, the middle of --.

SPEAKER: It's not near the mines.

MS. LETOURNEAU: No, but that was his jurisdiction.

CHAIRMAN: Another point too is obviously the cloak of secrecy is decreasing since we are here presently trying to inform you of what's happening near Kiggavik and I think what's happening in the States is not quite pertinent because these gentlemen here and the gentlemen of Saskatchewan Environment are not controlling what's happening in the States. At this point I think Bernie has one last statement and then we shall shut it down for lunch.

MR. ZGOLA: Yes, I'd like to make just one last statement. There are two major uranium mining areas in Canada. These are northern Saskatchewan and Elliott Lake, and I particularly want to answer Dr. Harding's allegation that because there are native people in northern Saskatchewan, that no research is being done. Much of the research that has been done in Elliott Lake, and continues to be done in Elliott Lake, is simply because there is an Indian reservation, a native

reservation, at the bottom of a small river that comes from the uranium mines in Elliott Lake.

CHAIRMAN: I guess we meet again at 1:30.

ADJOURNMENT

CHAIRMAN: Good afternoon ladies and gentlemen. Before we proceed, Mr. Hicks of KRC would like to make a few statements, or ask a few questions.

MR. HICKS: Before we get going this afternoon I just wanted to make it clear to the audience, especially to Inuit, that the regional organizations like KRC, KWF, KIA, had no role in setting up the structure of this meeting. We weren't asked as to how we thought would be the best way to organize a meeting to convey these kinds of information. I guess I'd like to suggest that since the whole reason for this meeting is to provide information to Inuit in Baker Lake and the region as a whole, that perhaps Mr. Laporte should ask Inuit how they feel the meeting went this morning and how they would prefer to see it organized, so that perhaps we don't have a repeat of the terrible meeting we had in Rankin Inlet that I'm sure nobody who was there wants to even think about. Most importantly, we didn't learn anything at that meeting and I would hate to have this meeting end and think that we could have learned a lot more. So perhaps I could make that suggestion.

CHAIRMAN: Thank you Mr. Hicks. As you pointed out we are here, there's 19 of us government people, we are here to provide information. We're not here to sell the uranium mine because frankly, that's not our job. We're not sellers. If the FEARO panel, or if the people of Baker Lake, or especially if the FEARO panel recommends that the mine go ahead, we will ensure that it's well regulated. The people from AECB will put the conditions needed to make sure it's as safe as it can possibly be. The people in land use, the water resources people, the Department of Fisheries, will have input into the drawing up of the water licence, and the end result of this would be a set of licences and a set of conditions that the mine will have to work under, which is as safe as we can humanly make it possible. But this is not what we're here to discuss really today. We just want to tell you what we know as workers in the government, in regulatory agencies, what we know of uranium mining. Mr. Curley.

MR. CURLEY: Now that we know what your role is (few words inaudible) what is the public's role?

CHAIRMAN: The public will be expected to bring their concerns up to the FEARO panel, the Federal Environmental Assessment Review Panel, which will be sitting here in April, I think. Mr. Scott is here if you want more details on the planning of the FEARO panel. Today we're just trying to impart information. If you have questions on uranium mining we'll try to answer them to the best of our ability. What we have

here is a panel, or group of people that have dealt with uranium for quite a long time, that have done a lot of research including what Dr. Brunskill was describing this morning, and can tell you what we think will happen if there is a uranium project developed. At this point, what we had planned was to finish off giving you the basic information which in this case would be how contaminants are transported in the air or on the surface of the land, like Greg Brunskill was talking about, ie how it's transported in the water and where it ends up in the water. Bernie Zgola would like now to indicate to you how it's transported in the air. Then we would go into a description of the Kiggavik project and then a description of the various aspects of the project, with illustrations from mines in Saskatchewan. Is this satisfactory to you? Would you rather take another approach? Does anybody have any comments at this point on our approach? Mr. Curley?

MR. CURLEY: I think it's a bit late in the game to change your form (few words unclear). I think you should go ahead. But one of the things that you may want to do (few words unclear). We don't want to be put into a position and have you try and take a stand right now (few words unclear) but the public is always interested in a much broader issue than this proposal or that proposal. They have an ongoing concern, so I think tomorrow night there will be an opportunity, if we can organize one, and show that -- we will inform you (few words unclear).

CHAIRMAN: Okay, thank you Mr. Curley. As a matter of fact, mentioning the evening, would the people like to have us here available this evening just to come and ask questions again? Especially those people - obviously those people that aren't here won't hear me.Those people that you know would have been interested but couldn't make it during the day. We could be here from 7:00 to 9:00 this evening to answer any questions anybody wants to bring up to the various government resource people. We will be here from seven to nine. Right now I guess I'll turn it over to Bernie to describe - I'm sorry, I've got a question here.

NEW SPEAKER: Perhaps before you start this meeting we should warn you. Maybe you should have provided us some agenda (few words unclear) from one subject to the other. It wasn't - for several of us it was getting kind of boring so it might be better if you could stay with one subject rather than skipping from one subject to the other.

CHAIRMAN: We are trying to make it so that one subject follows the other and give you the information. We've been

sidetracked by some of the questions. I don't feel comfortable refusing to answer a question, so that's why we might have gone aside in a few cases. We'll try to restrict it to more pertinent questions this afternoon I hope. Also, this afternoon we'll be leaving the field of radioactivity and pathways and things to go looking at things that are concrete, like mine buildings and roads and ports and airports, which I think will be easier for people to grasp, and hopefully and we'll get more questions about what does this really mean, or what's this really going to be, in effect. I think you'll have something that you can visualize more easily, in this case. Any other questions? Yes.

MR. NAGO: I was just wondering if you hold off on the (few words unclear) for now since we have the translations (few words unclear) some of these people they don't speak English (few words unclear). They're stopping come in tonight, the rest of the evening. You know it would be better for you (few words unclear). Only 21 earphones, that's not enough.

CHAIRMAN: I agree with you Mr. Nago, I hope we get the equipment sometime this afternoon. As soon as it gets in we'll try to get it set up. I'd prefer not to delay everything because we might not get the time to finish it tomorrow, so how about if we start with this part on the aerial pathways and hold off to see when the equipment is coming before we start discussing Kiggavik in any detail?

MR. NAGO: I mean we've been waiting for things all our life from the government (few words unclear).

CHAIRMAN: Good point. So have we. So have we. Would you recommend then that we stop at this point and wait for a couple of hours and then start over again?

MR. NAGO: I think that would be really appreciated by the older people.

CHAIRMAN: Lorne?

LORNE: Is it possible to have sequential translation rather than simultaneous translation, using a microphone?

CHAIRMAN: That would be a possibility too. Mr. Nago, would that be more suitable at this point? It would slow us down but it won't stop us completely.

MR. NAGO: Yes.

CHAIRMAN: Okay. Any other comments, suggestions?

NEW SPEAKER: (Inaudible)

CHAIRMAN: We would probably, if we were running out of time, continue with the presentation this evening, for part of the evening, and then have an informal session. Well Mike, would you feel comfortable coming up front and-- not really, but you'll do it anyhow, right? So Bernie, I guess we'll have to do sequential translation.

MR. ZGOLA: You're going to have to tell me when to stop. Okay, this morning, we must have bored some of you. We're going to give it another whack this afternoon. You've seen this before. This is the chart which shows all the possibilities that radiation can get to the environment and people. This is the source of radiation here. These are the various paths and intermediate places that the radiation can be transferred to the environment. Dr. Brunskill talked about the water pathway, which as you can see is probably the major pathway here. What I'd like to do is briefly talk about the air pathway which is up here, and then very briefly try to bring the whole thing together.

As we said before, we will find out this afternoon that a uranium mine naturally has a lot of pieces to it. It has a mine, a mill and essentially a place where they put the waste products from the mill. Again, to put it in perspective, a mill is where they take the rock from the mine and extract the uranium, and the place where they put the waste from that mill is called a tailings pond. Two minor parts of this mine are also a place where they put the ore, the rock from the mine, and also any waste rock that they remove from the mine. The material that they remove from the mine, which has the uranium that will go through the mill, is stored on the surface before it goes to the mill. There's always a bunch of ore, a bunch of rock from the mine that is then fed to the mill, and you have a small pile of that always ready to be fed into the mine. And all of these pieces are the source for both water and air contamination.

The air pathway, or the material that is transferred by the air from this mine would be basically dust and radon and its daughters. Those are the main contaminants, if you will, that will be transferred by air. The dust, how it's transported will depend on the size of the dust. The size, if it's big dust it will go very, very close; if it's very small dust it will go a long way away. If the dust is small it will be carried far past the mine, or further from the mine than if the dust is large. If the dust is large, it will fall very close to where it starts. If it's small, it will fall far away and then can affect the environment beyond the close part of the

mine. The dust will then fall in water, possibly, or it could fall on the land, and it could fall on the lichens, moss, anything that caribou or other animals eat. If it falls on the water, then it becomes Dr. Brunskill's problem. If it falls on the land it can also become Dr. Brunskill's problem when the snow melts, and when the rain falls, and washes it into the water. If it stays on the ground and the caribou eats it, or some other animal, or inhales the dust before it gets taken away to the water, then it finds its way into living things. Then of course, ultimately it can find its way to a human who kills the caribou, or it can go down south and you have a vegetable garden to grow other crops, it can be eaten by humans directly from the crops. This afternoon we will talk about methods of control of dust.

The other contaminant is a radioactive gas called radon, and the radon gas breaks down into things that are called daughters, which then can be inhaled and give a dose to people who inhale. Radon and radon daughters are generally an occupational problem, that is a problem for the workers at the uranium mine, rather than a problem to the environment. Methods for control of radon and its daughters will also be discussed this afternoon, and the monitoring of both dust and radon and its daughters will also be discussed this afternoon. That just about covers the air pathways.

I'd just like to say a couple of words about bringing this whole thing together. There has been a lot of research done, both real and by computers, on how contamination, radioactivity, travels through the various compartments and ultimately to the human as a dose. The only one I'd like to mention at this time was a fairly large moose study done in Elliott Lake about a year or two ago. Hunters were requested to give pieces of organs, or flesh of any moose that they harvested. Now, to put it into perspective further, the Elliott Lake uranium mines have been operating on and off for about 30 to 35 years. Also as was mentioned this morning, there is an acid problem in the Elliott Lake ores. Normally the mines operated with very very small amounts of regulatory controls for over 20 years before about the mid-70's. All these pathways were allowed to discharge without control into the environment for over 20 years. Moose were harvested beyond any influence of the mine. If the water and the wind, say, were blowing down this way, there were certain moose that were harvested away from the influence of the mine. There were moose harvested close to the mines and below the mines where the influence of wind and water would be at its maximum. The result of this study was that

there was no significant difference between the moose, and that to my mind is a fairly good indication of the type of impact radioactivity plays. The worst case scenario where there were no controls for mines operating in Elliott Lake (word unclear). If anybody wants a copy of the study just let me know. It's a study done on behalf of our research section and it's available to the public at no charge. That's all I've got to say about that. (end tape side #3).

NEW SPEAKER:(inaudible)

MR. ZGOLA: Thanks for pointing that out. If you're not close to a topic, you forget important things like saying whether it's uranium mines. Yes, they were uranium mines and they still are uranium mines there. As a matter of fact, it (Elliot Lake) is a concentration of five uranium mines, and at this time it has about 160 million tons of tailings present on the surface.

NEW SPEAKER: You said there were differences in the tests. What are the differences and the effects of these?

MR. ZGOLA: Excuse me?

SPEAKER: You said there were differences in, going back a bit, you were talking about I think, moose. What's the difference then? What did you mean by the difference?

MR. ZGOLA: I meant to say that there was no difference statistically. Does anybody understand what statistics are? I'd like to explain it very quickly again by flip of a coin. If you flip a coin it can come heads or tails. Statistics is a mathematical concept which predicts or gives you confidence in how often it will come up heads or tails, depending on how long you spend flipping the coin. The longer you flip the coin, if you flipped it forever, statistics tells you that there will be exactly the same amount of tails or heads. We don't have an infinite amount of moose or anything else, so what science does is it says I have 50 flips of a coin. If my result were 22 heads and 28 tails, how much confidence would that be that I have an equal chance of getting one or the other? Using these same rules and looking at the number of moose that were caught up there and down there, and comparing the results, scientists say there is no difference, no statistical difference, or that the chances of getting a moose with that amount of contamination here or there are equal. Is that okay?

QUESTION: I have a question in regards to the proposed Kiggavik mine, the uranium mine. If say, you don't mine it, is

it still active or is it only active after you mine it?

MR. ZGOLA: The ore that's in the ground is active, that's why the people want to mine it, because it is active, there is uranium there.

QUESTION: Excuse me, I mean is there radiation being produced when it's not mined?

MR. ZGOLA: Okay, I understand. If you bring uranium to the surface from underground, you make the radiation available to the environment much more than if you left it in its natural state. Even though you remove 95% or most of the uranium, the remainder is still radioactive.

QUESTION: The uranium that's underground?

MR. ZGOLA: Almost as much.

QUESTION: You were talking about tailings, something about tailings and where the tailings would be put or where the containers would be put, or whatever. Where would be the tailings, what containers would there be?

MR. ZGOLA: I think that will be addressed either by the company in their presentation, where there will be some very good examples for the type of technology that is currently used, or when our colleagues from Saskatchewan Environment make their presentation (few words unclear).

QUESTION: What about - like you stated that you did some study on the moose when you make that comparison about the wind drift and whatever in the mines and stuff about moose, but there hasn't been any study done on the caribou, and the Inuit. What they like to do is go out hunting, and even before they get back to their community, they like to eat it right on the land. I wonder when those studies will be done about caribou, whether they contain radiation, and how soon would that be done.

MR. ZGOLA: I think there have been studies does on caribou and the impact of radioactive fallout, have they not? In other words, how much cesium they contain, Chernobyl products, etc. To my knowledge there haven't been any studies done on caribou to look at the type of radionucleides, the type of atoms that are associated with uranium mining. Is that correct? I'm not aware of any either. What I would suspect would be smart, and something I think the regulators and perhaps the FEARO panel would suggest in their deliberations, would be for the company, UG, to get caribou, or fund a study where caribou would be captured and the

background contamination of the type of products that come from a uranium mine are established before any mining starts. If the mine were to go ahead, a good monitoring program is needed, which again will be discussed this afternoon, where you would harvest some more caribou and see what change in levels has occurred. As a final note, I think the company is already doing work such as this on fish and vegetation.

QUESTION: Earlier on you were talking, explaining about the dust, or the radiation, how far it can be carried depending on whether the wind is heavy or light or whatever. Have there been done any studies in the Arctic or on the Inuit communities about heavy blowing snow and how fast it goes and whatever, and switches in every direction? Have you done any studies on the directions of the wind and how strong the winds are in these Inuit communities?

MR. ZGOLA: I gather the winds here are very strong and one of the reasons it's called Keewatin is because of the strong wind that's here (few words unclear). But yes, there's been a lot of work done - if you read the company submissions and one of the requirements for further submissions both to ourselves and to other regulatory agencies, environmental impact statements - one of the requirements is to establish around the site how strong the winds blow, which directions they blow, and then to, in designing the facility, try to eliminate the impact of dust to the extent practical. Also they have to look at temperature ranges, precipitation, etc., so in other words, weather in general is looked at in great detail for that particular site. In addition, if the uranium mines goes ahead and we'll discuss that later on, you will have a program which will monitor the type of dust, and where it goes. If need be, the regulatory agencies, if the dust levels are too high or they're going too far, have mechanisms whereby the licencee would be told to do something about it to decrease the effect.

QUESTION: (few words unclear) you're supposed to be a regulatory agent, you're not a promoter and and you're not here to say if there's a problem we'll get it fixed, because some of the information that I have heard during the presentation to the legislative assembly, apparently scientists agree, particularly the AECB and medical association as well, says that there is no known technology today to be able to contain safely (few words inaudible) tailing control. But you just say (few words unclear) problems with the tailings, we'll get it fixed, we'll make sure (few words unclear) and you just go ahead and (few words unclear). I don't think it's as simple as that, and I

resent a little bit too the way you treat the radiation process, the radiation system as though you can sort of show it as being as trivial as a flip of a coin comparison. I don't think that's a good method to use, even though you're trying to make a point of statistics. (few words unclear) because I recently saw a film that indicates to me that there are no living fish in that certain river for longer than 55 miles. You can go ahead and say there was no way of controlling them, but that's what could happen to the environment and it has happened, and I saw the (seas), there was an Indian man with his son pointing at a moose, feeding on the Serpent River, and telling him he could no longer catch that, or watch that animal. Maybe you could keep that (word unclear).

MR. ZGOLA: The only thing I can say is uranium was not properly regulated until the middle 70's. The destruction of the Serpent River system and the lack of fish in the Serpent River system was not caused by radiation, but was caused by the acid production of the ore. With respect to your comment about natives standing there and pointing out the moose to his son, and that he can't eat it anymore, this study that we've just done essentially proves that groundless, and his fears are groundless, and I hope that now he will eat the moose and not worry too much about it.

QUESTION:(inaudible)

MR. ZGOLA: Again, that's why studies like that are done. Perhaps you'd like to translate that, the fact that the native can now eat the moose. He doesn't have to worry about it. To go further, natives also eat muskrat and beaver. Projects to look at the muskrat and beaver the same way as we looked at the moose are going to be done in the near future. I think your last major point was that there was no proven way that when the mine is finished, to guarantee that the tailings, what is left after the mine, will not affect the environment adversely. Again, we'll talk about that this afternoon. It's a fairly complicated issue and maybe we should get on with the technology aspects.

QUESTION: One more question (few words unclear) the people should know that (Inuktitut) Maybe you could help us understand a little better, maybe by flipping a coin.

MR. ZGOLA: If it will help.

QUESTION: Yes. Could you (word unclear) the tailings in the short term, the simple term for whatever the remainder is that they left behind. I think you should talk about radiation, I think that's the one that we're really concerned about. Is radiation dangerous

compared to uranium, and how long is the last band of radiation? I think it's (few words unclear).

MR. ZGOLA: It's a good question. Radium is a product of uranium, there's a (word unclear). Uranium changes eventually into lead if we remember that movie, and there are many many intermediate steps and various types of products and radiation involved before uranium changes into lead. You observed correctly that the radium is one of the major hazards of tailings. When you remove uranium from the ore in the mill, you don't remove the radium. When you take uranium from the mine and put it in the building that extracts the uranium, the tailings have most of the radium that was present in the ore. You don't remove any of the radium; you just remove uranium, or 95% of uranium, so the radium stays in the tailings. Your other question is how long will it stay there? A very long time. The half life - half life is when the radium atom changes to produce something else. Half life means if I start with 50 radium atoms, how long does it take for half of them to change to some other atom. So the half life of radium is about 1600 years. So if you were to start off with 50 atoms, in 1600 years you'd be down to 25 and in another 1600 years you'd be down to 12 and half, if you can have half an atom in your clip - and I don't know if you can translate that. I've oversimplified. There are a lot of other issues, not just the radium, and quite frankly, the tailings remain active for a very very long time. This is why science and regulatory agencies set standards and requirements to make sure that the tailings do not impact on the environment and humans any more than is necessary.

QUESTION: I'd like to ask if the gas from the uranium travels to the moss, to the ground; how long does it take for it to get away; how long does it stay in the ground?

MR. ZGOLA: Let's go back again. We're getting into this deeper and deeper, but the gas that you're talking about is the product radium, one of the intermediate products from radium, and it's called radon gas. Radon gas has a half life of about three days. Remember we talked about one thousand six hundred years for radium? Try that for translation. So this gas has a half life of three days. It then changes into radon daughters, which are solid particles. It's kind of hard to see how a gas turns into a solid but it does. These three daughters have half lives in orders of minutes to two hours. Half of the radon gas will be gone after three days. The chain that comes from that, the disintegration products, when this radon gas changes into its daughters, then the daughters change into other things and eventually what you get is things like lead 210 and pollonium 210, and they may

stay on the grass, on the mosses, and become available for eating by caribou. The importance of the gas and daughters is only for breathing in. If you breathe in the daughters or the gas as it's turning into a daughter, then the radiation that it causes in your lungs is hazardous, it can cause damage. Those are very very short lived products.

QUESTION: The reason why I'm asking these questions is because it's important to me because it might be dangerous to me because there's caribou. Up here there's no trees or anything and the caribou only eat the lichens and what I'm scared of is that these caribou are going to eat the lichens with (word unclear).

MR. ZGOLA: I think it's a valid concern. It's necessary to be worried about that and that's why we're going to be talking about monitoring. This is why I suggested that what the company do or someone do is to harvest caribou to see what the levels are in the caribou. We are looking at lichen and mosses at Rabbit Lake and analyzing them, which is a mine that has been operating for 13 - 14 years, and it's been putting these products on the lichen, and we had talked about that this afternoon, and again I think that the results are that it's really not that significant. One final point. All our (word unclear) from the mine, you can't tell any difference between the measurement of radon and its daughters in comparison to 50 miles away. In other words, you cannot tell if there's any extra radon gas or daughters within about a kilometre to five kilometres.

(end of tape side #4)

MR. ZGOLA: ... and the excess cancer deaths, lung cancer deaths that were resulting in Elliott Lake in the middle 70's, that the Board decided to expand its staff and seriously regulate the industry on its own. I'm going to have a very short presentation after this, because all of the things that we're discussing now are coming up. We right now have 270 people approximately (few words unclear) and there's 12 in the uranium mine division and four of us taking care of waste management in uranium. We also have resource people like Carmel, with their expertise, and last but not least we have individuals like Ron Barsi and Cliff Potter and provincial agencies both in Ontario and in Saskatchewan, as well as a host of experts at Environment Canada, Fisheries, other departments, Labour, etc., that have input to the regulation of uranium mines.

NEW SPEAKER:

Just one brief additional point. I think people may have got a misconception or misimpression about

the fish that were killed in the Serpent River system. I think it's fair to say that the sulfur got them first.

MR. ZGOLA: The acid.

SPEAKER: The acid got them first, and that if there were fish alive in the Serpent River system today they would not be (word unclear) and in fact the lakes downstream, immediately downstream (word unclear) 160 feet deep are unacceptable for drinking water; they're also (few words unclear).

MR. ZGOLA: I think the levels of radium in (word unclear) in the Serpent River system have been decreasing over the years and I think they are around one to three parts, picocuries per metre (word unclear) I don't know the exact (word unclear). The drinking water is highly monitored for radium; the perels is one becquerel per litre, which is 25 picocuries per litre, or about nine, ten times higher than the levels of radium in Pointer Lake now, so therefore I can't see why it would be inadvisable to drink Pointer Lake water from a radiological standpoint. It might be inadvisable to drink Pointer Lake water for other reasons, be they coliform contents or other chemicals. As far as not being able to swim in Port Lake it seems to me - I've never heard that's the case - I've seen people swimming in Port Lake and other than they're disobeying the law, I wouldn't know of any reason why anyone couldn't swim in Port Lake.

CHAIRMAN: I think there's a question at the back.

QUESTION: I just want to ask a question that you said that you had some data that you could make available for free, and I just wondered if they are translated into Inuktitut.

MR. ZGOLA: Unfortunately they're not. Canada is bilingual, not trilingual yet.

QUESTION: And a question that I have is if that's the case were you brought here by Northern Affairs?

MR. ZGOLA: I was requested to come here and talk about what the AECB does by Indian and Northern Affairs.

QUESTION: If that's the case, I wonder if it was known that the Inuit people over here cannot, some of them cannot speak English at all. Was that known before you came here?

MR. ZGOLA: I suspected that was the case, but that's not something that I can take care of.

QUESTION: Before you came over here I think you must have known that there were unilingual people over here who only speak Inuktitut and the people that you have to get to, those kinds of information that you're giving out today, it's very very important to them. These are the people that are going to end up with the mine if it goes ahead, and I just wondered if there's going to be some translation done on your data that you said available.

MR. ZGOLA: I can't promise that we in the AECB would do it. I'm sure that if it were deemed necessary, money would be found and translations could be made.

QUESTION: I want to know if you would sign a piece of paper saying you will do your very very best to get it all translated.

CHAIRMAN: I will answer this question because I don't think it's the AECB mandate to translate them. Will I sign a piece of paper? That's a tricky one. I will do my very best to have something translated. Now the question is what exactly, how much we can translate and how much time we have to do it, is the question.

NEW SPEAKER: Yes, I'm prepared to get something translated.

QUESTION: Then please stop saying, anyone else is going to be going up there, and saying all our data you can go and get it; it's free, it's there. Don't say that, because what good is it to some of the people here, and in fact some of the people that you, in your letters you stated, you put this workshop on for them (few words unclear).

CHAIRMAN: There's a problem with the amount of material that's available on uranium. You've heard, Mr. Harding and Mr. McKay, quote papers, and you know there are different opinions; there's a number of papers published by different scientists. We will try to get a transcript of these discussions organized translated and sent around to the communities. I don't know how much more we can do at this point. Mr. Hicks.

MR. HICKS: Two comments. First of all in answer to Ruby's question I want people to know that the National Uranium Commission(?) is preparing a whole series of fact sheets on questions about uranium and they will all be translated. The problem is that the federal and territorial governments are giving us very little time and very little money to do this kind of work. Mick Stuart has all these government guys who are basically helping him out, they're trying to tell people everything is under control. We're trying to get information to the people that they can take home, think about, discuss with their friends and we have

about six weeks to do it, before the government says we can't do that any more, we're taking our money back. We're also doing a word list, expressions like half life, explaining what's a half life. My second comment is on Bernie's answer to Kujuark's(?) question about the half life of radon gas. Kujuark asked how long, what's the half life of radon gas and Bernie said three days. I don't think the answer was very clear, unintentionally, I think Bernie wasn't (word unclear). The radium is going to be decaying for thousands and thousands of years. The radium that is left in the tailings will be breaking into smaller things for thousands and thousands of years. Each little piece of radon gas will only exist for three days, but that radium is going to be giving off radon gas forever. Thank you. That's important.

MR. ZGOLA: I agree with you. I thought I said that. I said a very long time. Thousands of years is fine. I wouldn't say forever though. Arsenic is forever and other stable elements are forever. Radium will not be forever, because it has a half life. It will be a very long time, but not forever.

MR. HICKS: My question goes back to your original story about moose in Elliott Lake.I'm not sure why you told us this story.

MR. ZGOLA: I think I told the story simply because there was a lot of doubt expressed by people this morning and - the whole day. What is going to happen to our caribou? It is also part of our pathway presentation. I thought it was a good illustration. There was a comment made by Dr. Harding that there was no data on northern Saskatchewan. Well perhaps there isn't, but I thought it was relevant to give you our experience in Elliott Lake where other uranium mines exist.

Mr. Hicks: I'd appreciate it if you could perhaps wait until I finish my questions. It will make more sense that way. What I meant by my question is the Keewatin is not Elliott Lake and caribou are not moose; they don't eat the same things. What you're telling us is a happy story, you know, here's one little happy story so don't worry about your caribou.

MR. ZGOLA: I never said don't worry about the caribou.

MR. HICKS: That's the logical point you're saying (few words inaudible). What I'd like to hear you tell us is what happens if there is - maybe it's not a happy story, maybe there's a spill. Like in Saskatchewan, one and a half million litres, or in New Mexico where a whole tailings dam burst and wiped out an entire river system. How are you going to get the radium out of

the caribou, radioactivity out of the caribou, if there's an accident? That's my question.

MR. ZGOLA: I don't think that I implied that moose were caribou. As a matter of fact, if I recall, I said it would be necessary or prudent or whatever language I used, that one analyze caribou here in the Keewatin. Caribou are not moose, their diets are completely different, etc. That's obvious I think. Thanks for pointing it out; people didn't realize that. Now as far as a happy story, I was sure you were going to bring up several unhappy stories, so maybe a happy story is a good juxtaposition. Your unhappy stories about Churchrock Falls in New Mexico breaking a dam and wiping out a river bed and sheep, etc., is well documented (few words unclear). The fact that the Key Lake reservoir burst and released, I think, somewhere in the order of 88 million litres, is also history, and it happened. The question that has to be asked is what were the effect of these latest accidents in Canada.

QUESTION: (Inaudible)

CHAIRMAN: Bernie, Tagak, please. Can I get Bernie's comments translated first.

MR. ZGOLA: Sorry, I ran on.

CHAIRMAN: Okay, a point before we leave.Jack mentioned that Mick Stuart had all these government people to help him. If you remember at the beginning I said - I didn't say Mick Stuart had asked us to come here. It's TFN and KIA that asked us to come here to give you the information. This is what we're trying to do. If indeed (word unclear) that you only have six weeks to spend (few words unclear) funding, I think it's for you to determine questions you want to ask the FEARO panel when it's here. There's another little question. If they deal with other aspects of tailings we will be getting back to it after we describe the Kiggavik project and start dealing with (few words unclear). Would that be appropriate at that time?

MR. HICKS: I just want to respond to what you just said.

CHAIRMAN: Okay. Tagak, you've got something too.

MR. CURLEY: I want to respond to the invitational issue. I wanted to make a point. TFN (few words unclear) two or three years ago. It's very important to have people informed about what's happening in the mining industry. Nobody disputes that. Inuit organizations (word unclear). But it is they a month ago you come over here and hold a workshop so we can work together. You took advantage of that, I appreciated your bringing all these agencies together, without in your introduction to the idea of workshop, the only company outside of government included in your mandate was Mick Stuart. Nobody else. Why?

CHAIRMAN: Okay, I'll answer to the best of my knowledge. The invitation was given to us in May, 1988, about nine months ago, which means that government works pretty slowly but you knew that already. The reason why Mick Stuart is here is simple. He's the only expert on what's going to happen at Kiggavik.

MR. CURLEY: That's not what I asked (word unclear). The question I have is when you're organizing a meeting (word unclear) public and native organizations, in my view you've got to be involved in its planning. You didn't include, any one of you, regional organizations until the invitation (few words unclear).

CHAIRMAN: The answer to the fact we didn't involve anybody, I agree with you we did not involve too many people from the Keewatin. I'm sorry about it. I should have done better. I was thinking as a "kabloona". When I'm asked to deliver a product, I prepare a product and present it. Obviously that's not the way it should have been done, but I agree with you. If there is a cause for further workshops of this type, maybe we could get together and discuss what you would like to see covered at that point.

MR. HICKS: There is one question on the caribou, I'm a little concerned if it's left there. The speaker, he talked about the studies of the moose in Elliott Lake as though that was the worst case example (few words unclear). The worst case is actually when a nuclear reactor like Chernobyl explodes and contaminates thousands and thousands of square miles including the wildlife. That's where the uranium goes to the reactors, the uranium from a mine, if it were created at Baker Lake, would be going into reactors and probably it might make its way into weapons. In the case of Lapland, 90,000 caribou were destroyed after Chernobyl because the radiation was about 10,000 times what it would have been if there hadn't been the accident. The question is whether the uranium from Baker Lake might come back to you, not just from the mine tailings, but from those kinds of accidents that have global impacts.

CHAIRMAN: I'll let Bernie answer this one because he is the regulatory agent dealing with uranium. I'd also like to remind you that we've started getting off the topic again.

MR. CURLEY: It's all related to uranium. It's all related to uranium mining.

MR. ZGOLA: When I said worst case, it was the worst case from the point of view of moose eating the type of vegetation that occurs in southern Canada. I keep saying that it would be very prudent in respect to mining, uranium mining, to get caribou data. The tragic Chernobyl accident which caused 90,000, or many caribou to be destroyed in Lapland has absolutely nothing in my mind to do with the hazards of mining uranium. In order to keep our focus on the hazards of mining uranium, which I think we should do, I would just like to leave you with one thought. Whoever's uranium you're mining here, and I really don't care to whom it belongs, I will put it to you that there will be uranium mined somewhere else in the world, be it northern Saskatchewan or another country, and reactors will continue to be built for the generation of power. Whether it has Kiggavik

uranium in it or not, it's really immaterial at this stage of the game. I would like to leave you with another thought. Lead is mined for various reasons. It is used in batteries, gasoline and bullets. Does that mean we have to stop mining lead?

CHAIRMAN: Can we call a coffee break? One more question? Okay.

QUESTION: (inaudible)

MR. CURLEY: I think we're going to probably move over to another subject, but I want to say one thing. I just want to say one thing. I think we're going to move on to another subject and so we probably could do with a break. By the flip of a coin. What I want to say is this, and I don't think (few words unclear) lecture the public what (word unclear) should be all about, because we're in the, politicians are going to decide whether nuclear industry is good for the nation. I don't think he's going to decide. I don't think we're short of politicians (few words unclear) and I think we should shut him up whenever he gets out of line. Members of the public have the right to question anything related to the nuclear industry, after the mining alone. Let's stop trying to be kept in the zoo. We've been kept in the zoo for long enough. We have broad concerns, it's just (word unclear) if you and Ed would like to try and (few words unclear) broader moral principle related issue.

CHAIRMAN: Can I answer that one.Has it been translated?

MR. CURLEY: I translated that one.

CHAIRMAN: I thought you might have. The answer to that, and you're right; you're right.Politicians will decide whether we use nuclear energy and how we use it. The point I think that Bernie was trying to make, and I'm trying to repeat, is that what our political masters decide is what we'll end up doing. Right now they're still trying to decide. We were told, we were asked to come and give you information we have about uranium mining. This is what we're trying to do. I realize that there are other considerations. We just don't feel comfortable handling it, because our business is not to give you information on political matters. It's to give you technical information which is what we're trying to do. When we have coffee, we will come back and start talking about Kiggavik as a mining project.

ADJOURNMENT: (end tape side #5)

CHAIRMAN: Before resuming maybe we should go through what we've done to date. I've been asked to produce an agenda

so that people can refer to it. I've got a number of copies which I will pass down and you can hand it out. Unfortunately it's only in English. To resume where we were, we've done the point one, which is the discussion of uranium and radioactivity. I will now start discussing uranium mining operations, how we regulate them and their environmental and health effects. Although we want to be as broad as possible and just give you a discussion of uranium mining in general, we will start off with a description of the Kiggavik project, which is obviously closer to your hearts and has more immediate effects. After we have looked at a brief look at the Kiggavik project, we'll go back to the regulation of uranium, which is Bernie Zgola's information that will be disseminated again. After that we will go into bit by bit about the mining and the ore processing, tailings, water treatment, transport and use of concentrates, abandonment and reclamation of the site, and monitoring - so all these different aspects of a uranium mine will be looked at. If you have specific questions on different aspects of the Kiggavik project, you might want to wait if possible until we start doing the different pieces one at a time, and that will probably make it easier to understand the questions and get the whole picture together. So starting off now, we'll start off with Mr. Mick Stuart to describe the Kiggavik project.

MR. STUART: Ladies and gentlemen, my name is Mick Stuart. I'm Executive Vice President of Urangesellschaft Canada Ltd. I'm a mining engineer, and I've been in the mining business in various parts of Canada and elsewhere for more years than I care to admit. I'm very happy to have this opportunity to talk to you, briefly I've been told, and I'm supposed to do this in ten minutes, which is going to be tough, but I'm delighted to see so many people here from Baker Lake and from the other communities and I hope that you will find that this is a useful session and one which will give you information which we all know you need.

I will describe the project in a few seconds, but first I should tell you where we are. We are at this point in time, in the middle of a feasibility study, which means that we are examining the engineering, the environmental, the economic aspects of starting a mine at Kiggavik, which is about 50 miles to the west of here. Because we are, as I've said, in the middle of this study, this particular time is perhaps not ideal, to present you the facts of the study, because it's, as I've said, incomplete. We won't have full answers to be able to tell you. All we can do is to bring you approximately to the state that we're at now, which I will now describe.

I have put up this little picture which perhaps is rather complicated, but it does contain the elements of the project, and again it's only in English, for which I apologize, but I will be describing it and the various parts that make it up, and where we are at this stage in the preparation of the study. The main elements of the proposed project are in these boxes which have a heavy outline. You will see that these are shown to be the mine, the mill and the uranium product, and the other boxes around are all related to those main features. Given, as I've said, the main features are in the boxes with the heavy outline, I now want to deal with the project more or less in sequence, starting with the incoming part of whatever is required to produce those main items.

You see in the top left hand side of the picture, barges from Churchill and other ports. This is the part of the project which involves bringing in materials from the outside that are required for using, developing and operating the mine at the Kiggavik site. This section involves merely transport, and the transport part of the study is close to its completion, and we have a pretty good idea now of how we will transport supplies and materials into the site. The next item is the marine terminal and that is the site which we have now chosen as the preferable one. We looked at quite a number of sites here in Baker Lake and we have chosen the ideal, what we consider to be the best site, which is about six or eight miles to the east of the town. The plans for that marine terminal are in the process of being prepared at the moment. We do not have those at this point. From there a winter road would be built from the terminal site into the Kiggavik site. You see, if you follow the arrows --

QUESTION: (Inaudible)

MR. STUART: It's not possible to do much better. Is that any better? Sorry, that's the best we can do. But it's really just a chart and I would describe the various parts of it. At the end of the road, of course, we have the site, and there we have an open pit mining operation proposed, which would have two pits, two separate open pits. The plans for the open pits, the design of the open pits, are in the process of preparation. We have a general idea of the type of mining we will do, and the general design, but this is not yet at the final stage. The next principle item, which is the box outlined heavily in the centre of the three, is the mill, and this is the process plant in which the ore is treated to remove the uranium as a concentrate. This plant is also in the process of being designed, and we are reaching the

stage of having nearly completed the flow sheet, that is to say the sequence of operations that will take place.

QUESTION: Because the graph is in English and for us, those people who don't speak English and can't read English, I wonder if you could point out what sections that you're talking about.

MR. STUART: Yes, I apologize. I hope that this will enable us to follow. This is the mill building. This is the mill that we're talking about and this is the process, plant where the uranium ore is taken and treated to remove the uranium part of it as a concentrate, which we call yellowcake, and that is over here. In carrying out this process, one of the requirements to extract the uranium from the ore is sulphuric acid, and the intention is to build a sulphuric acid plant on the site which would convert sulfur, which would be one of the products brought in, to sulphuric acid for the process. As you heard earlier this afternoon, the process requires neutralization of the acid after the uranium has been extracted, and for this we use limestone which is partly used as mined, as quarried, and partly after it has been passed through what we call a lime crock. The limestone, the lime plant and the sulphuric acid plant are at the present time being designed. We do not have the designs finalized on that yet and we expect to complete those within the next month or so. We are fortunate in that there is a limestone deposit to the west of Kiggavik which would enable us to take the lime from there, the limestone from there, truck it to the mine on another winter road, and use that for the neutralization process.

The other installation which would be involved with the project are an airport for the bringing in of mine workers from local communities and from Winnipeg or some such place in the south for people who would be required to work on the mine, and also for bringing in groceries, spare parts and to take out the uranium concentrates after the process is completed. The last item at this stage is the camp site which is the place where workers would be housed whilst they're working at the site. The intention there is that the workers would be (glitch in tape)

MR. ZGOLA: Unfortunately they're only available in English and French and not in the native tongue. Okay, the Atomic Energy Control Board regulates everything associated with nuclear energy in Canada. That means reactors, mines, refineries, accelerators, little reactors as found at universities, waste management sites, etc., etc., etc. It does this by issuing licences, operating licences. These licences spell

out what the licencee must do to operate that facility, and how the licencee must conduct himself to protect the environment as well as the worker, and of course the public. I have one copy of the licence that is currently in effect for Rabbit Lake in northern Saskatchewan. I will leave it with the other three documents for the library and if anyone wants any more or any other licences that we issue, just let me know. Unfortunately they're only published in one language, English, except the ones issued in Quebec which I think are in both English and French. Perhaps if the mine goes ahead here we'll have to have it in a third language.

We issue licences generally for a period of one to five years. During this period of time the company is asked to submit data and reports, and to some extent, that will be addressed in the monitoring section later on this evening or tomorrow or the day after. Also inspections are conducted by ourselves and various agencies of the licence facility. To give you an example, at the Rabbit Lake site in northern Saskatchewan, a project officer that works for me goes there about four or five times a year. In addition, a project officer who is responsible for worker health and safety goes anywhere from four to six times a year. In northern Saskatchewan our colleagues from the Saskatchewan Department of Environment and Labour probably go once a month. Our licencing process is co-operative. We take the input of many agencies - Saskatchewan Environment, Saskatchewan Labour, Environment Canada, and others. If you have a look at the licence you will see a list of the agencies whom we consult before we issue a licence. This joint regulatory process continues on a day to day, week to week basis among the working people who take care of the sites.

I think in summing up, unless you have questions later -- I have worked in this industry for 12 years. I really don't care if a uranium mine opens here or not. It's not my business. It is the affair of FEARO, it is the affair of people here. The only thing I can tell you is if it does go ahead, we will regulate it the same way as other uranium mines are regulated. Taking care of the site specific requirements of the area.Thank you very much.

CHAIRMAN: Do you have any questions at this point? Paul.

QUESTION: If for some reason the mine was shut down half way through operations, what regulatory authority does AECB have to require the company to stick around and take care of the waste management problems?

MR. ZGOLA: It's a very good question, thanks. Both the Atomic Energy Control Act, the regulations under that Act, and the latest uranium mining regulations, prohibit the abandonment by a licencee of prescribed substances. In these regulations which I'll give you, sections 5, 6 and 7 deal with exactly that issue, and one of the conditions is section 5(d) which says no person shall suspend or cease the licenced activity at a mining facility or a part thereof except in compliance with the terms and conditions of a licence issued pursuant to section 7 or 8 as applicable, and section 7 or 8 detail the type of licence that would have to be issued to control the licencee further during the suspension or decommissioning of a mining facility.

QUESTION: I'm sorry, that didn't really answer my question. If the company declares bankruptcy and it's a foreign owned company like Urangesellschaft, what could the AECB do to make the company pay for the clean up and make it comply, if they're not around any more. (end tape side #6)

MR. ZGOLA: It's an interesting point. It's never happened during the past 15 years let's say, since the Board was in proper regulation of the industry. I guess if you want to speculate, if UG declared bankruptcy, folded their tent and left, there could be a criminal prosecution of the officers of the company. I think the Act allows for that. I would venture to say that UG or anybody connected with UG would never mine again in Canada, unless they made a guarantee that something like that would never happen again, but to be quite frank with you, there are no bonds, no sureties. We have discussed that issue on many occasions. However, the Board doesn't have the legislative power to require the issuing of bonds, guarantees, etc. One last comment on that. I can assure you that, as I said before because it is uranium mine and not a gold mine or another mine, I would almost bet that if something like that were to happen the fact that it is a uranium mine and it's a high profile, politicized issue, some government agencies or institutional controls would then be mobilized to ensure that the facility was properly decommissioned.

CHAIRMAN: I'd like to answer a number of concerns. Because the uranium mine, or the mine is in the Northwest Territories, means it also comes under our land use regulations, our Lands Act, and the Northern Inland Waters Act, both of which have the clause that allows us to ask for security so that if they do walk out we have some money to do the repair work. The Government of Canada has some money. Although

Urangesellschaft is not presently a Canadian company - within three years, is it?

MR. STUART: If I could just address that. First of all I don't really think that this is a terribly relevant question because Urangesellschaft Canada Ltd. is a Canadian incorporated company with the same rules and regulations as any other company here, and a joint venture (word unclear) are in exactly the same position. They have a subsidiary company here. We've both been in the business here for many years. We've indicated our dedication to activities in Canada, just as we have in other parts of the world, but certainly here in Canada, the part that I'm responsible for, is being run as a Canadian company. We would conduct our responsibilities exactly the same as anybody else, whether of foreign or Canadian origin. The likelihood is that if we did have this mining operation we would have raised substantial capital in this country. It would be unthinkable that we would run away from our responsibilities.

QUESTION: Would you permit Louis Pilakapsi to stand over here and say a few words and some questions, if you don't mind?

MR. PILAKAPSIE: Yes, I am of course the president of the Keewatin Inuit Association. Maybe this has nothing - well, maybe you're not thinking about this at this present time. Because I'm a resident of the Keewatin region and I'm an Inuk, I have a concern for the people of the Keewatin region and I will be talking to the people at Baker Lake as well as of the Keewatin. What I'm hearing from Urangesellschaft Canada is like, you know, as long as they take the uranium, the ore, whatever they sell, whatever they take out of the ground, as long as they take it and they take off and they take the money, they don't care even if the people of Keewatin region are dead or shot. And it seems like even if a lot of people are against uranium mining, they seem to be bound and determined to go ahead with it anyways. Like using Rankin Inlet as an example, when the mining operation was over then the government made a settlement and they started up the community again, but there were a lot of problems with a lot of things in the way of how the people were operating over there, or how a lot of people lost out of it. I have a lot of feeling for the aboriginal people even though they might not help me personally. I feel that all the aboriginal people should work together to gain what they want. I will talk about Baker Lake because there is going to be a uranium mine about 50 miles out of this settlement here, and I just wonder, because there are going to be a lot of white people being brought up from down south because they really

want to mine the uranium over there, and I wonder what's going to happen to the young people that are going to be growing up over here. Say for instance in Rankin Inlet I used to work for the mining company for a little while underground and there used to be a lot of bad talk going around, and I could see that the young people now are not going to benefit anything out of it as far as I know. Even though we try to tell the company that this is how we feel and this is our concern and really believe in it, but they don't seem to believe in us because I don't think they believe in the native people. Say if I was to ask a question, which is more important, life or money.I'm not against development and mining and everything else, but the thing is I'm very concerned about a danger that might come up to the people of the north. That's the only thing I'm concerned about, that the dangers or the health hazards of mining this product.

I know this is just a workshop, but just listening to the workshop and the people that are talking from here, they seem to be in preparation stages already. In the meantime we'll have workshops and at the same time maybe the mine is going to start up, maybe the preparation is going to be finished. It's good to have workshops and stuff like that but it seems like they're preparing to go ahead with something already. It just seems to me that while we're having a workshop here they're already preparing to do this and that and another thing. It's good to have some development going on but I know that there has got to be jobs for the younger people. Maybe not so much for myself, but the younger people are the ones that are going to be experiencing the bad side of what's going to happen when uranium mining opens. Lastly I'd like to say that I'm going to be in Ottawa in a short little while and I'm going to be talking to the Minister of Indian Affairs and I'm going to ask him why they let them go ahead and start mining even when the native people have not wholly agreed to go ahead with something like that, and the Inuit people are not also involved in issuing licences to start exploration and mining.I just want to say now that I'm going to be available to anyone if you need my help or whatever, but I would like to make it clear that I'm going to be against uranium mining. I think we have to think of the future of the young people. Thank you.

CHAIRMAN: Thank you for expressing your concerns. I'd like to make a few points that maybe haven't come out well enough yet. When we speak of Kiggavik and when Mr. Stuart was speaking of Kiggavik, I think we have to consider the fact that it might not go ahead. We are planning, we are informing you so that when the FEARO

panel, the people that will make the decision that it should go ahead or not, come, you have a better idea of what the concerns will be. The main reason why Mr. Stuart was saying they are preparing so much is that when the FEARO panel hears your concerns, the company will have to say this is what we're going to do so that these concerns will be alleviated or this is how we'll take care of these concerns. This evening and tomorrow when we start describing the mine and describing the regulations that will be applied, we hope to demonstrate to you that the chances of another Rankin Inlet happening are very slim. I might sound like a broken record, but I think one of the things that we've got to realize is that what happened in the 60's is not happening any more. There will not be any more "Rankin Inlets" because we have regulations now that prevent people from leaving.

Before any more questions, I think Mr. Stuart would like to answer some of the points that you raised.

MR. STUART: Well I certainly appreciate hearing your views. I'm concerned by some of the remarks you made which suggested that our company was not interested in the people in the north. Certainly I think we've not just come in here. We've been working in this area for about 14 years now, and I believe that we have a reasonably good record of employing to the extent it's possible in exploration, employing local people, and trying to use the services of local business. Certainly we are most interested in the well being of people in this area. If we are going to work here, this is going to be a primary concern for us.Life is most certainly more important than money and I can assure you that is precisely our philosophy. It has never been any different. It is the feeling that I would have for my family just as I understand it is for your family. We are fully in agreement on that one. As far as the suggestion that we are going ahead regardless of the feelings of people here, I must say that I think this is purely a misconception. What we are doing is the necessary studies. That's what I spoke about - studies. That's what we are doing, and we have to do that in considerable detail in order to fulfill the requirements of the FEARO process. I'm not sure I've answered all your points but I would just like to finish by saying that during the course of the studies and the hearings which will take place, we will be hearing from you people, all your concerns. We've heard some today and there is a lot more that has to be said in relation to the project and the studies that are being done. I hope that you will give it time to complete the process. Finally, I think I can give you this assurance, that in the final analysis - we're just getting into this

process now - in the final analysis when it comes to the decision process, which we are not at yet, then the decision to go ahead will only take place if we have the support of local people.

CHAIRMAN: I guess Mr. Curley you've got one more question, and then I guess we break for supper.

MR. CURLEY: Yes, I wanted to ask a question with respect to regulations. I want to clarify one statement Mr. Stuart made about whether the project is going to go ahead if the FEARO panel agrees with it or not. But at one point during a CBC radio interview he said they didn't come here, they didn't come up here, invest time and money for nothing. That was about three weeks ago. They said they come here to put the idea to develop the mine and export the product. That's the objective and I think (few words unclear) that actually on the assumption that it's going to go ahead. I know you're neutral but evidence showed other things. My question is the perception from the (word unclear) on the other side of the expert that are concerned with production of uranium, that the regulations are not rigorous enough. They're not tough enough. They don't bite. They can't bite the bullet on this issue, and I think the public has a right to be concerned with that because you're passing the buck to your uncle and Indian Affairs, your land use regulations, your next cousin, provincial cousins. What you're telling me then is the public will pick up the tab if there's ever any environmental damage. So what we're trying to get from you is there anything in the licence that can indicate that the project proponent has some responsibility in the event that some disastrous thing occurs. The Key Lake project was known as the safest mine in the world, and that nothing could happen to the tailings pond. But something serious did happen. No consequences to the company. Whereas I was making a comparison with the people up here, the marriage licence is tougher than the regulations that he's talking about. The chips normally fall on individuals and they don't go crying to their uncle and to their mother in laws, will you bail me out financially on this. You know they take up the task. But what happens to the company if they break the rules? Nothing. What are your minimum requirements if the 90,000 gallons of the toxic radioactive chemicals kills everything out at the pond.

MR. ZGOLA: Okay, what can we do? What are our vehicles to punish, or to keep the licencee in line? We can pull the licence which means they can't operate. We can prosecute. We can take the licencee to court. We can also bring criminal charges against the top officers of the company. Okay, so those are the

vehicles. Have we ever used them for uranium mines? We've suspended licences until something was done, but we've never prosecuted, okay, either the company or officers of the company. With respect to this horrible nuclear accident in Key Lake, I think we should spend a couple of minutes to inform the people of what actually happened. It was not the tailings pond that failed. It was a reservoir containing contaminated water. The reservoir bank failed. The quality of the water was ten times higher than drinking water standards. Point five one (5.1) becquerels. The environmental damage caused by that, judged by any unbiased person, was insignificant. Although the damage was judged insignificant, for various reasons the company was required to pump a lot out of a lake, a small lake, that received the spill, back for treatment, although the water was below discharge limits. Now I put it to you again that something like this, these types of requirements, can only happen in uranium mines. I personally, and some other people, including some of our lawyers - because we have lawyers on staff - would eagerly like a case where we could justifiably prosecute a company for any transgressions of a licence. Until this time, something like that hasn't been happening. And in closing, that either means we're doing a hell of a good job, or the companies aren't that bad.

CHAIRMAN: We'll take one more question from the back and then we'll break for supper.

QUESTION: Some of the things that I was watching this morning, he says he comes from Baker Lake, there is going to be no presentation that was biased (few words unclear) It was very difficult for even myself to understand, let alone the elders that were here. This English (word unclear) was talking in their ears and trying to listen to the TV at the same time. We are talking about the future of the Inuit people and that may change their lives and UG hasn't been out of here for more than 40 years, and why are they now just coming out and why is everybody (word unclear) to come around? Is it because the FEARO hearings are just around the corner? I think trying to cover a great field of information in two days, I don't know (few words unclear) my elders here don't understand what is going on. If they're quiet don't think they are understanding. They're quiet because they don't understand, and all of the language that they used today, I've never heard some words and I speak English. And I feel strongly for them (few words unclear) very much. I hope that you're not going to leave, and go back to your department thinking that the people of Baker Lake were quiet because they understood. They are quiet because they don't

understand the words that you are using. Because it's far too great for us to understand them. I hope that you will be making greater efforts to explain what you are trying to do here. This is not UG; this is the Inuit people in Baker Lake and in the Keewatin region, and I am disappointed that we are now just starting to talk about it (few words unclear) doing our homework, just starting now. I'm wondering will there be any further explanation of this thing, or (few words unclear). I would like to know.

CHAIRMAN: Thank you for your comments. You're right, it is a bit of a short time to try to explain all that is known about uranium and uranium mining. (end tape side #7)
... right now it's pretty, as Andy was saying, you can wave your arms but you can't really describe a mill until you see pictures, and hopefully we can start into those this evening and you'll get a better feel for what is being proposed out there. The other comment that you made is also true. We are here because of the FEARO hearings. We've been asked to try to give you some information so that when the FEARO panel comes up you have a better feel for what they're talking about, or what the concerns are related to uranium mining. Even I have some problems with some of the words being used, so it's nothing surprising that other people would too.

QUESTION: I'd like to ask Mr. Stuart if Urangesellschaft would consider writing to the regional coalition and (word unclear) public education a cheque for maybe $75,000 to allow us to do the kind of work that we think needs to be done before any kind of hearings proceed, so people have a decent level of information.

MR. STUART: As I said earlier, we are certainly concerned for more information to be brought out in the course of these hearings.As for whether I'd be prepared to contribute $75,000 to your organization, I'm not sure that that would be the best way to get information of a neutral nature on the project. I'm certainly not prepared to make that commitment at this point. There are various ways in which information can be conveyed to the people, and I'm certainly interested in getting that information.

QUESTION: One example? Two? Three?

MR. STUART: Of what?

QUESTION: Information.

MR. STUART: Information? By having seminars similar to this one, and by having information meetings at which people can express their views; by having contact between the communities, between the people in the communities and the company, and anybody else who is interested. There are various ways of doing this.

QUESTION: Organized by?

MR. STUART: Organized by preferably somebody who is unbiased.

QUESTION: What about if the (few words unclear) How about a process whereby the president of the Wildlife Federation, the president - all elected people of all these regional organizations - how about if they consulted people and ask what questions they wanted answered, and we found resource people who are going to come and speak to those questions, and you were able to bring all the resource people you wanted to discuss with those resource people, would you pick up the tab for a meeting like that, where people, the regions, defined the agenda instead of Indian Affairs?

MR. CURLEY: We're no less biased than Indian Affairs, your company, the Chamber of Mines of the Northwest Territories and in the north, so who is there, who is left out there?

MR. STUART: I have to say that that's a very good question, and it's not easy. But I would also point out that there is a certain process which is taking place at the moment. That is a process that we did not call for. It was called for by the various government authorities who decide. Now that is something which is taking place now, and obviously this has to take precedence. It's an interesting suggestion and one that I think we might talk about. I don't think we can decide on the spur of the moment what this might be. It's an interesting suggestion, how we could get a better understanding of the feelings of the people and to understand better the details of the project. It's been said here today that a lot of things are not understood. Words are being used and descriptions are being made that are not understood. Perhaps we can correct that.

CHAIRMAN: Thank you very much and we'll be back here at seven o'clock.

ADJOURNMENT.

CHAIRMAN: Welcome gentlemen. I hope you haven't missed too much. We were just getting to a description of various aspects of a uranium mine operation. I think

we'll go right into this. Cliff, will you be showing the slides or is Ron going to do it? Ron is going to do it, okay. Ron will start by giving us a number of pictures of operating mines in northern Saskatchewan. Oh, sorry.

MR. HICKS: I actually have one question left over from before supper.

CHAIRMAN: Okay, well that's probably a good time then, Jack.

MR. HICKS: I just have one more question left over from before supper, and that is in terms of the regulatory process and public review if - I guess I've always wondered what will happen if an open pit uranium mine was proposed for 50 miles upwind and upwater from Toronto, you know, not out where - not up here where we're out of the public eye pretty much. What would happen if it was right next to Toronto. Would it make your life any more difficult, would people be any more, would they scrutinize your long term plans any more carefully, and do you really think you could put a mine like this 50 miles from Toronto?

MR. STUART: That's an interesting question. I really couldn't imagine that it would be any easier than it is here, but then it's not easy here. That much is obvious. Clearly we would have to convince people that there was a good reason why there should be a mine there, and I don't think it's very likely from a geological point of view, but obviously we would have to go through precisely the same process as we're going through here. It might be a little easier. We might not need the simultaneous translation, but obviously other things would be more difficult. The process would be the same, and obviously, as we said earlier on, as I said earlier on, we would not go ahead with a project 50 miles from Toronto without local support any more than we would here. I think the problems would be somewhat different in nature but probably just about the same, in terms of order of magnitude.

CHAIRMAN: I have to correct one of the statements I made this afternoon. I mentioned that the FEARO panel would decide whether there's going to be a uranium mine or not. The real matter, the facts of the matter is that the FEARO panel will make recommendations to the Minister of Environment, who will then discuss them with the Minister of Indian and Northern Affairs and the Minister of Renewable Resources or whatever, Energy, Mines and Resources, with the government of the GNWT. Thank you Lorne. Okay, shall we proceed with illustrating some of the aspects of the mining operation?

MR. BARSI: My name is Ron Barsi. I work with Saskatchewan Environment. We were invited to come up here and show you what is in Saskatchewan, so you would have a better picture with which to formulate any questions you may have for the panel or just think about uranium mining in general. I have a few slides that I can show you, like in the agenda. It's been set up so there's different stages and we'll just follow the different stages as we go through.

Okay, we're up here right about now, in Saskatchewan, the province just like it's laid out there. All of our uranium mines are laid around the geological basin called the Athabasca Basin or the Athabasca Sandstone. This is Lake Athabasca up here, Ranger Lake over here, and Wollaston Lake here. Saskatoon down here, about 1200 kilometers from the mine. Saskatchewan, the province, went through the same kind of public review that you did, but - like you're doing now for the Kiggavik project, but the one thing - we had the old Beaverlodge Mine up on Lake Athabasca that started in about 1955, and that ran for several years and that was the only uranium mine that was in the province. Then in about 1975 Amok Ltd. found a deposit over on the west side of the Athabasca Sandstone that they wanted to develop. The province had to decide what to do, as there was a lot of interest just like there is here tonight, about whether or not uranium mining should proceed: just the pure simple fact of should uranium be mined in the province of Saskatchewan. The government chose to set up a public board of inquiry, which in my understanding will be similar to the FEARO panel that is going to be looking at Kiggavik.

The big thing about this thing is that they looked at whether or not uranium mining should happen in Saskatchewan, and then also whether or not the actual Amok Cluff Lake Mine could be permitted to proceed. So it was two things that happened. You can see up here that it lasted a little over a year. They went all over the province to talk to many, many public meetings. They looked at seven major issues, the environment being one, public safety being another, and worker health and safety. They did look at the moral issues of uranium mining, and at the end of that time they released this report. They have 122 conclusions and 51 recommendations. The important thing to remember again is they did look at two things - whether or not uranium mining should even be allowed to happen in the province, and then secondly, they looked at whether or not Cluff Lake goes.

They decided to let uranium mining proceed and one thing that came out in one of the recommendations is

that they wanted to really beef up the strength and the control that the province had over any development that would occur. One thing they did was to set up a section within our department called the Mine Pollution Control Branch that came in with a very strict set of requirements for environmental control of uranium. Most of what I will be talking about tonight is the experience we gained since the Cluff Lake inquiry and what has gone on since then. Here's the Athabasca Basin again. Here is the old Beaverlodge Mine I told you that started about 1953 and closed down in 1981: we'll talk about the decommissioning of that later in the agenda. The mine that was reviewed in the Cluff Lake inquiry is right there. They started producing in about 1980 I believe. Another mine that was in existence before this one was - I forgot about this one - is the Rabbit Lake Mine, which is right there on Wollaston Lake. And this is the Key Lake Mine. Now McLean Lake is an explored site, there are reserves there but there's no mine. The same with Don Lake, there are identified reserves but there's no mine. The Midwest Lake Mine has now got a test mine down there. The Cigar Lake Mine has a test mine. The Rabbit Lake Mine has the Rabbit Lake pit, Collins Bay B Zone, and then there's Eagle Point and Collins Bay A and B Zones over here. There's a very large complex on here, and this is where I understand some of your people went down for a tour a few months back.

Before any of these mines were allowed to proceed, like Star, they had public reviews, the same as what is happening here. Cluff Lake and Key Lake had full scale boards of inquiry. The Rabbit Lake, or as we call it, the Collins Bay-Eagle Point Expansions, had public meetings; I guess they called them. They didn't call them boards of inquiry or anything like that, and the Midwest Lake and Cigar Lake test mines went through an Environmental Impact Assessment Review Panel and there was public input into that. However, this is the main concentration of uranium mines, and it's again concentrated there because of the geological structure.

I guess the first one on the agenda that we're supposed to discuss a bit about is the infrastructure is the Rabbit Lake, Collins Bay Complex, phone one site photograph. Anyway, the first thing you get with a mine is you're going to have some (word unclear) that go along the mine - or the airstrip, is up here. This is some of the Collins Bay mine up here. This is Rabbit Lake pit. This is their first pit and it's my understanding that this is the hole that's fairly similar to what the Kiggavik geology is like. One thing I should mention before we get into this discussion, is that before a mine can proceed,

after they have gone through the public process, they have to sign a contract with the Province of Saskatchewan. We call that a surface lease, and you were talking, and had questions about what do mines, do, about decommissioning and things like that. We are looking at bonding, but while we're getting the bonding thing off the ground and in place, we're using this contract with the the company. It has various things in there about environmental monitoring, decommissioning, the employment levels - you know this kind of thing is all in that surface lease. It's like a contract, and this is in addition to any legislation that is actually in effect.

Anyway, back to the site. Because you have the mill, this is where the rock is brought. The rock is extracted out of the pit. They bring it up to the ore stockpile areas. They will also have waste piles but they are outside of the photograph over here.The ore is brought up and it's stationed around here so they can blend it to get the right mixture they want for the mill. Then it's (word unclear). You have a cam, you have to have a cam. You're going to have to have fuel storage. You're going to have what we refer to as a boneyard or a laydown area for spare parts, heavy steel, spare equipment, that's all in here. Off to the side is a sewage disposal station, and they have a lagoon set up for the camp over in here. Beside these roads there's a - you can just make it out here - pipeline system for bringing minewater and contaminated water all the way from their other mines up to the mill for recycling. You can't see it very well in the photo, but there's a tower here and a beacon, for aircraft and radio for the camp. This is Wollaston Lake proper. This is the minewater pond for this one.They bring out the minewater and then they recycle it through the mill.

This is another shot of the same place. Here is the sewage lagoon; here is their camp. This is Wollaston Lake, it's a winter photograph. Again you can see the ore stockpile sitting here. This is a good shot of where they seed in the ore and we'll be talking later - like the ore comes in here, it's stockpiled, they put it in here; it's crushed and ground and then fed into the circuit so they can remove the uranium. After the uranium is removed, the sand, which is basically the tailings, is left and that's taken out by a pipeline. The old tailings system is over here. You'll see slides later; the new tailings system is now their old pit. Again that's another shot of the mill at a different angle. There is the laydown area I was talking about. Pipelines: I think that's about all that we haven't talked about on the other pictures. I had a couple of slides of the Cluff Lake camp, just to show you what that

company has done. These are where the employees stay. This is the recreation complex and kitchen, and the rest are all - this is another recreation area and this is the cafeteria. These are employee houses. All the Saskatchewan uranium mines except for Beaverlodge, which is now closed down - all of the other ones have what they call long distance commuting or whatever. Their employees are flown in on a seven work day, seven rest day cycle. Now they have two charters, one that goes south to Prince Albert-Saskatoon-La Ronge. That brings in a lot of what they call their southern labour which turns out - to be the majority (which is in the same for Key Lake) About 70% of their people I think are southern employees. Then they also are required in that contract I was talking about, to pick up native employees at the little outreach communities - communities like Camsell Portage, Stony Rapids, Black Lake, Fond-du-Lac, Wollaston Post, supply all of the northern miners. They bring their employees - that's the north and then the west side there's Beauval and (?) Cross and places like that (few words unclear). There are two feeder charters that go around and bring the people in on a rotational basis. They work seven days and rest seven days.

That's a typical camp, ie what they're staying in when they're at work. This is a close-up of the area and this is the rec complex and the kitchen area they have at Cluff Lake. Now that's all I had on the infrastructure for this part of the discussion.

CHAIRMAN: Thank you Ron. If anybody's interested and has more questions, now's the time, or else we could go on to ask Mr. Stuart what the plans are for Kiggavik and he can compare them what there is out there already. Mr. Hicks?

MR. HICKS: I guess the thing I found interesting about your presentation, sort of like some of the earlier presentations, is if I didn't know who you were working for, I wouldn't know that you're working for a government department in charge of looking after the environment. That sounded very much like the presentation made by the employee of Rabbit Lake who was at the meeting in Baker Lake.

MR. BARSI: Why would you say that?

MR. HICKS: Because it was a quickie slide tour of the operations. There was no - I didn't get any feel for how you guys go about taking care of things, looking after things.

CHAIRMAN: That's probably partly our fault. We are doing this on purpose. We're just giving a feel of what there

is to see on the land at this time. We will be getting to the monitoring aspects of the Department of Environment and the AECB later in the session, but at this time we just wanted to show you what the mine would look like.

MR. HICKS: Some comments were made about the role of the public inquiries in Saskatchewan, and I know this afternoon some people were asking themselves whether the public inquiries made the decisions, were influential and what difference it made and what would happen if the company shut down and left and such. I feel the need to give a little more accurate history of the public inquiries, because in fact the public inquiries in Saskatchewan came out of a split in the New Democratic Party. The New Democratic Party policy recommendation was for a moratorium on uranium mines, and the Saskatchewan Mining and Development Corporation and the Mineral Resource Department had already granted some approvals and begun to look at contracts, and got very nervous that mining might be shut down and the compromise in the party was a public inquiry. The panelists who were appointed were pro-uranium. That has been documented many many times. What's most interesting about the way the public inquiry was done in Saskatchewan, and this is important to know, that permission had already been given not for the Cluff Lake mine but for some of the drainage for the Key Lake mine, before the Cluff Lake report had in fact been given to the government. This can all be documented by the dates. More interestingly, the Key Lake companies had begun to drain mines before there was even a board appointed to investigate the Key Lake mines. I know it sounds like there was a great detailed investigation and the inquiries approved uranium mines in Saskatchewan, but that's not at all what happened. The Minister of Mineral Resources, Jack Messer at the time, admitted that they simply wouldn't break the contracts. They were in fact looking at contracts with Japan. Those of us who went through the public inquiries in Saskatchewan feel that they were largely for public relations, the panel had made up its mind, and studies have since been done confirming that the northern native people either supported a moratorium or were outrightly opposed to the mines. Because those issues were ruled out of the inquiry, the moratorium was ruled out, settlement of aboriginal land claims was ruled out, and they went on trying to get some benefits for jobs from what was referred to as the surface leases. All the documentation shows that the surface leases have not been abided by. At this point native northern people have about 15% of the jobs; some of them believed that the surface leases were going to get them 50% of the jobs. Now, there's a lot here to talk about, but I want to be

sure that you don't get the impression that these were thorough inquiries that were made before decisions about the mines to go ahead were made, because in fact that's not the history of the mines in Saskatchewan.

CHAIRMAN: Would you care to comment on that Ron Okay, any more questions? We really can't touch this one. We did tell you that Urangesellschaft has not started mining at Kiggavik at this point, that we are waiting for the FEARO panel. Any questions on the structures that might become Kiggavik at this point? Yes Paul.

QUESTION: I have a question about the mine waste from the Rabbit Lake mine. What's the current proposal for permanently disposing of those wastes?

CHAIRMAN: Care to answer that one, Cliff.

NEW SPEAKER: We will be getting to abandonment and restoration, I think, along with a few more (few words unclear) in the package.

CHAIRMAN: Okay, I guess we could go on to the next stage, which is a description of the mining operations infrastructure. Jamie.

QUESTION: Is Mick Stuart -- I'm speaking on behalf of Renewable Resources when I ask this question. We are now talking about what Pierre calls infrastructure - roads, camps, things like this. I'm curious to know for instance in selecting a route for the winter road that will supply Kiggavik if it goes ahead, will you be consulting with local people on the preferred route. (few words inaudible) I think I've asked my question Mick, could you fill us in on that, how you would select the route for the winter road, taking into account environmental and other sensitivities. Thanks.

MR. STUART: I think the question, as I understood it, was in relation to the winter road we propose to use between the dockside at Baker Lake, close to Baker Lake, and the Kiggavik site. We certainly will be consulting with the people of Baker Lake in relation to this, and we have already done some surveys. We have a general idea of the direction, obviously there are not a very large number of choices, but there are some choices, and we have surveyed these with some consultants who are qualified in the construction of winter roads, but before deciding on a final route, we certainly would be taking the opinion of local people. (End tape side #8)

MR. CURLEY: Okay. Because I'm directing this to - I don't know which expert I'm directing it to. I think it should

probably be you, Mr. Chairman. I know that Mr. Stuart will have an interest in this. Obviously, from the experience that we have seen in Saskatchewan, a number of public inquiries were held probably related to specific projects here and there. What I'm wondering is, if that's going to be the case with each project, obviously UG has a number of interests with the deposits around this land and now we're dealing with one project, Kiggavik. What happens if there's another major ore body that is found? Are we going to go through another exercise or would this one-time public hearing, is it going to be enough? We're not that satisfied with a limited inquiry. This is not a real public inquiry. This is just a mainly environmental and socio-economic related inquiry. It turns out that we don't have a provincial government up here. The federal government is not interested in dealing with the broader issues, so could we have a statement agreed upon as to whether or not we'll go through another route. We could be giving permission or giving either approval or rejection to this particular proposal when in fact UG might have another major deposit ten miles or twenty miles down from the site that could be developed in one or two years from now.

CHAIRMAN: This is a question that is difficult to answer. At the moment UG does not have another deposit developed to the point where they would be looking at mining in two years. To tell you the truth, I'm not sure what would happen, Tagak, if they came in with another proposal in the short term. Within three or four years we presume that we might not be the major player any more, as far as that's concerned, because the Territorial Government is expanding its voice and taking over some of the duties of the Northern Affairs Program. This is not much of an answer really. It's just that it's a bit difficult to look that far into the future, for this case. Every development project is looked at individually, and it's looked at not only by ourselves but by a group composed of Environmental Protection, DOE, Department of Fisheries, the GNWT, Renewable Resources Pollution Control, and Energy Mines and Resources, and a number of other departments, As a group, they decide what to do with the proposal. In this case they decided to refer it to a FEARO panel. Most other mines have just been referred to the regulatory people to handle as part of regular applications. Sorry I can't be more forceful, yes or no. Any other questions?

MR. HICKS: I thought that was a really bureaucratic answer. I think the question that we're dealing with here is if the first mine goes ahead, if there's the

infrastructural development, does that increase the odds that other investors are going to decide to try and put in a second mine in the area, and would it make it more difficult for anyone to successfully oppose that mine if a first mine has gone ahead. So what I'm saying is, should people be looking at this as more than just one mine, as that they're potentially saying yes to a much larger development, as occurred in northern Saskatchewan.

CHAIRMAN: I think, I'm sorry, I'll have to stick with my bureaucratic answer which is every mine is reviewed on its own. I cannot anticipate the results of the FEARO hearing and the decision of our Ministers, or for that matter the committee that reviews all proposals, the Regional Environmental Review Committee.

MR. HICKS: Let me try asking someone else. Mick, do you know, have there been any other minable ore bodies discovered any where near Kiggavik, and has there been any increased exploration since you've announced your desire to proceed with this project?

MR. STUART: I think the answer to both of those questions is no. The level of exploration generally over the last few years, since we have been, shall we say, advancing the Kiggavik project, has been decreasing so that I wouldn't say there's been any increase in exploration activity, and I can't say for the future, but generally the exploration activity for uranium at the moment is not great. I'm certainly not involved in the regulation process, but to answer the question, I would have thought that if we were to take the Saskatchewan model, that certainly Cluff Lake did not settle the future mines. They all had their own inquiries, and so I would imagine it would be effectively the same here. That's a personal observation.

CHAIRMAN: Any further questions at this point? Okay, we had planned to have a bit of a, sort of a free-for-all at this point, and just have the people available for individual questions if they'd prefer this. The alternative is to have a look at what mining is all about. I have some slides of Saskatchewan mining operations. Which would the people here prefer? Well I guess we'll proceed then with the description of mining operations in northern Saskatchewan as an example of what could be happening in Kiggavik.

MR. BARSI: What I think I'll do for each of the discussions, is on your agenda, it's got two things. It's got mining and ore processing. Now, I'll briefly run through mining and ore processing very very quickly here, and let Mick, if you want, discuss the details

of the Kiggavik routine. The reason being is that ore processing is fairly site specific and I'm not sure you want to be bored with what's going on in Saskatchewan as far as what's going on in the mill building. It's basically just a big chemistry shop. If you have any questions I'd be happy to answer them. It's your choice.

Okay. Mining is basically digging a hole. In Saskatchewan we have two types of mines which is basically all you're going to get. You have a surface mine. This is the open pit at Rabbit Lake which some of the people have visited. They have seen this hole. Approximately 3500 feet across this way. The bottom of the hole, when they finish mining it out, is about 410, 450 feet, somewhere in there. The mining trucks go down the road. At the bottom a big loader - well first they blast the rock out, okay. It's loaded on the trucks with big loaders, then they haul it out and they put it into stockpiles. Now this is the old Rabbit Lake mine. The mill, and in the distance back here is the tailings area, the old Rabbit Lake tailings area. Each of these benches if 40 feet. It was designed like that for mine safety and for the people in the hole, so the slope doesn't break away and cave in on them, or whatever. It's strictly based on rock mechanics and the strength of the rock. Now (secondly) in an underground mine, which we had at the Beaverlodge one, or the Cigar Lake one and the Midwest Lake site are looking at underground, they cut a shaft down and the men go underground in very big tunnels, but that's not what you're going to have at Kiggavik. I'm not sure of the dimensions of the pit - Mick, how does this fit, estimate say compared to your big one? 3500 feet across, 410, 450 feet deep. It's smaller?

MR. STUART: Yes. We have two pits. Maybe I should come to that afterwards, when you've finished, and I could describe it in a little more detail.

MR. BARSI: Okay. What I'll do is just run through a quick - get into the ore processing here very quickly because this mine shows everything albeit the tailings is off in the distance here. You can still see kind of the three stages of what happens with the rock. They take the waste rock out, which is just waste, there's no mineral value in it, and this is the very edge of a waste pile here, a big waste pile here and over here. You can see the edge of it in here. The minewater is collected, any contaminated water which is all contaminated when it rains or whatever in the pit, comes in contact with the minerals, we call it contaminated water. It's all collected, brought up to this pond, and it's used in the mill as process water, and it's recycled. The ore is brought up in trucks, goes around the road, goes to the ore stockpile, then it's put in the grizzley here and it goes up through a set of crushers in the mill. It gets in the mill and it's ground down to stamps. It then goes into the mill building, where it is chemically treated, and they extract the uranium.

The vast majority of the contaminants like radium, which is the main one to watch for, and any other heavy metal contamination, is collected in the tailings and that's pumped by a pipe going out to whatever storage facility they have. Rabbit Lake has this old one over here which Cliff will be talking about in more detail later and has some better photographs of it. The product is collected, put in barrels, shipped south, and then goes down east for refining in Ontario.

There's another shot of the pit, and this one shows a bit of the waste rock. Waste rock here, waste rock there. Now you can just catch the edge of the waste rock down here, which I have some other photos of it later, that is all revegetated. When you first look at it - (few words unclear) when you first look at it you wouldn't recognize that is what that waste rock is. Again you can see some of the pipelines they've got. They're moving minewater around, collecting it at the pit, taking it over to the pond, then into the mill. The other thing that we do at all the uranium sites which I forgot to mention before, here's clean water. You know you have little lakes or ponds around all of the uranium mine sites. That water is diverted around the site so it is not allowed to come in contact with contamination. Thereby - our rationale is very simple; if you can keep it way from a dirty area, it will stay clean.

This is a 35 ton Walco(?) truck which is probably similar to what could happen at Kiggavik. This truck has just come out of the pit at Rabbit Lake. It has a load of ore on it. The trucker pulls under here, and here's a scintilometer under here which judges the radioactivity of the ore and the truck. They know, based on the calibration rating they put in here, the settings they put in here, as to whether or not this is ore material, which goes to the mill for processing, or whether or not it's waste material which goes to the waste pile. One of the problems you talked about the other day was dusting. This is an old water truck. They water, wet down all of their roads, when the trucks are driving back and forth to the mill, to keep, ore prevent any dust (word unclear). That's a scraper for road construction or whatever. But that's pretty well how it goes. You put it in the truck, haul it up to the mill, it's pretty simple.

Now these photographs now are on the Collins Bay B Zone, which is their newer mine. The old Rabbit Lake pit was mined out 1983, so they're up in the new pits now. Now what they've got here, the mine is over here (few words unclear) They drive down the road and there's a scanner right there - you can't see it,

and it tells them to waste, which is here, or the ore storage. This one, this whole area which is fairly big, you can see from the size of it, is all lined with a liner - a heavy black plastic liner, to keep any contaminated water from going down into the soil. You can see there's an exposed line trench around the ore zone. Any contaminated water that you can see here, you know, it's spring break-up, or you have a bad rain, the snow melting or whatnot, the contaminated water is collected, brought over to the corner, and you can see a pipeline here. It goes all the way back to the mill for recycling. The waste rock is usually very clean so we don't usually have to worry about the quality of the water, but one thing that we did do, is we put in a collector transferring run-off which makes its way back under the road and into the pit here, just on the off chance that you get some contaminated rock that got flipped in here by mistake.

Again, this side, from this side of the road, is that surface water divergent system I told you about. All the clean water coming from this muskeg, there's Harrison Lake over here and these little muskegs, that water is diverted away from what we call the dirty area.

QUESTION: (Inuktitut)

MR. BARSI: Yes, there are. Yes there's animals there, but you know as well as I do, that animals usually don't go around where there's a lot of industrial activity. You talk to the people working at the mine and they'll see animals come close but the sounds of the machines or whatever, they usually stray away. Very rarely do you ever see animals up on the area.

QUESTION: (Inuktitut)

MR. BARSI: There are no fences to prevent the animals from going in, so it's not impossible that they could go in if they wanted. We go up to each mine site once a month and in the last ten years I can see the odd track of an animal in close to a working area, but I have never seen one in an active mining area. However I am not saying that it couldn't happen.

QUESTION: I think this is more of a supplementary to what Mr. Pilakapsi is trying to get at. First of all I regret that I was not here this morning when radioactivity was being discussed, but what may be in a lot of people's minds, or hunters and so on, is in relation to the waste that remains, the contaminants that is. I think, if I could put it in this manner. How close would an animal or a person have to be before there is danger of contamination to the animal or to the

person if this could be the case, or whether the dangerous material which people up north have an impression upon, which is the way we hear it, or the way I hear it too, is when you get close to it, you're being radiated, or you're being contaminated and so on, and that is the impression that people get. So the question, the supplementary, is in relation to, in regarding the waste, is there danger to the animals and to people and how close would you have to be before you're life begins to be threatened.

MR. BARSI: I'm not a health physicist so I better not even talk about that one. The one point I can say is the men work right in the hole with the material, and you know we're animals too, so there's that. I'll get Carmel who discuss your question about distance a little better because I'm not really qualified to handle that one, if you don't mind.

MS. LETOURNEAU: Okay, if it's a question of distance, the main problem here is not the external function. If you inhale the dust or if you eat any food that would be contaminated by the operation of the mine, so it's not really a question if you're outside and how close you can get. Is your life going to be threatened; no, your life is not going to be threatened. As for the caribou, if the life of the caribou is going to be threatened, I don't think at the levels that we're talking about here the life of the caribou is going to be threatened. What may happen is that there may be a diversion of their routes, but their lives will not be threatened by radioactivity. However there have, as we mentioned this morning or earlier this afternoon, there have not been a lot of studies on caribou right now to confirm that. Hopefully we will get that information.

QUESTION: Now, I think she should qualify her statement because she's not a medical doctor.

MS. LETOURNEAU: Okay, I'm not a doctor, but at the level, okay, that we see at the mines, there have been a lot of studies by health (word unclear), by doctors, by biologists, that have confirmed that at that level the life of a person near this waste rock would not be affected.

QUESTION: How about in time? You said because of the toxic waste, one year.

MS. LETOURNEAU: Yes. Okay. One year, okay. The levels right now - does anybody know the levels of external gamma at Rabbit Lake?

Mr. BARSI: The background on the ore?

MS. LETOURNEAU: Yes.

Mr. BARSI: (few words unclear) they are now.

MS. LETOURNEAU: Okay, that's way below the present limits of the AECB, so that is considered to be acceptable. The external is not the problem. It's accumulation in body. It's not the external gamma.

QUESTION: What about I drive a skidoo on top of the mill?

MS. LETOURNEAU: Yes, we've looked at that also, calculated the number of hours, estimated the number of hours that you may be going. I don't know if you're allowed to go in that area, but if you were allowed to go, we calculated the number of hours, and the external is still not a problem.

QUESTION: (Inaudible)

MS. LETOURNEAU: Well, yes, exactly. If by any chance you happen to go there whether you're allowed or not, we calculated, the number of estimated hours that you possibly could be on the area, and still the external is not a problem.

MR. ZGOLA: Let's put it into perspective another way. At two milli(?) an hour you would need 250 hours on your skidoo, driving around on the ore pile, in order to reach your regulated limit for external exposure. To put it into another perspective, at the Rabbit Lake mine the workers can get an exposure of ten times higher than what a member of the public can get, and yet the workers who work at that mine all the time average about ten percent or one tenth, or about the exposure or the dose that a member of the public is limited to.

CHAIRMAN: We do have a doctor in the house, Dr. Mackenzie representing Health and Welfare at the GNWT. Dr. Mackenzie, would you care to make a comment at this point please. I'm afraid you have to come up front.

DR. MACKENZIE: I was looking for a table that gives you distances away from old tailings at mines. As I recall at a half a mile away there's no danger from old tailings. The danger increases as you move up to it. Up right close to it, depending on how much radiation there is in the mine, in the tailings, you are getting, so that it's a matter of distance. What they say if it's a very low radiation dose, it will take you a long time to get the amount of dose to hurt you, and if it's more high grade waste you would get damaged sooner. Still, the general thing is that the distance of about half a mile away there is no

difference between ten miles away. As you get closer to it, the dosage will go up. The dose will depend on what's in the pit or in the tailings, and the time that you are there will determine what damage you get, but that wouldn't be a very big problem for something out in the country after the mine had gone.If you went right across it every day you'd probably be all right. You would be better to take a detour around about a half a mile, then you'd be absolutely sure.

CHAIRMAN: Thank you Dr. Mackenzie. Yes, you have another question, Mr. O'Brien.

MR. O'BRIEN: We were just talking about external radiation just now. I'm wondering about internal exposure to radiation from breathing in radon gas that comes off waste rock and off what's left of the ore stockpile. Does that change things?

MS. LETOURNEAU: The risk from internal exposure is higher than the risk from external exposure. Now, to give a comparison, I believe that in the Elliott Lake region the dose from all the pathways is three, four millicuries per year. Now that is mainly from internal exposure and not external. So the answer is yes, internally it is a greater hazard than externally.

QUESTION: (Inuktitut)

CHAIRMAN: (word unclear) I guess you got this one.

MR. ZGOLA: The workers at a uranium mine are limited by regulation to certain levels of both internal gamma, radon gas daughters, and external radiation.Those limits, as I've mentioned before, are ten times higher than limits for the public. Is anyone in danger working in a uranium mine? I think what I'd like to say is that there's no safe level of radiation. The limits that do exist and the type of requirements that are put on companies, and the way the companies, the licencees conduct their affairs, the type of hazard that exists for the workers is of the same level as the permissible hazard to members of the public from the nuclear industry.

QUESTION: (Inuktitut)

CHAIRMAN: I think the question was if Kiggavik goes ahead, how long will you be in operation for.

MR. STUART: The present ores of the Kiggavik deposit are sufficient to operate the mine for approximately ten years. There are good possibilities that more ore would be found on the property during that period of

time. Right now we have two separate ore bodies on which the two open pits would be operated, and the life of that, as I've said, is ten years or approximately ten years. There is a good possibility that it could be extended by finding more ore on the property.

CHAIRMAN: Are there other questions?

QUESTION: In the early 70's people at Baker Lake tried to oppose Urangesellschaft from exploring for uranium through a court hearing, and UG said in the court hearing that the Inuit of Baker Lake, or people in the north, don't have any aboriginal rights; they have no rights to the land, but the judge at the time, Judge Mahoney said that's not true. The Inuit have some rights because they were there first. Is this is the reason why you're having a precaution on putting out information, too much information too soon?

MR. STUART: First of all, let me say that I'm not aware of the details of what happened in the - I think in fact it was the late 70's rather than the early 70's when there was a court case here. I joined Urangesellschaft just about that time, and as I recall the case was finished just about then, but I believe there were a number of companies involved in exploration at the time. There was much more activity here in those days, and there was certainly a court case. The exact nature of the position that the mining companies, and I think they worked together, it's not just Urangesellschaft, and I'm not aware of it. I know there was a difference of opinion and I know that a judgment was made which as I recall was sort of a compromise between the two positions. However, that is in the past. Certainly that has no bearing on our position and we have not made any (end tape side #9)

... economic, and we have certainly not in any way attempted to keep from the local people information about what we're doing. Perhaps we have not communicated as well as we should, and we have certainly in the large (word unclear) been endeavouring to improve that by having meetings in a number of communities within the last year. We hope to do better, but certainly there's no intention to hide our activities.

QUESTION: You prepared a project concept of, description of Kiggavik (word unclear) uranium mining, and I don't think anybody here has seen it. It's prepared by Beak Consultants Ltd., for Urangesellschaft Ltd. It explains everything from pre-feasibility studies, all the studies that are going to happen, right to the

end, and I have seen those, the maps of what the Kiggavik mine is going to look like, it's on there. I haven't seen any kind of information in town. This wasn't easy to find. Maybe later on you should show these to the public.

MR. STUART: You're quite right that a document was prepared approximately a year ago, and this was prepared for presentation to the Regional Environmental Review Committee in Yellowknife, which was the body reviewing this project up until about the middle of last year, at which time it was decided to refer it to the FEARO process, and the document that we prepared was a public document. It was sent here to Baker Lake at the same it was presented in Yellowknife. I know that quite a number of people do have that document and it's unfortunate that it wasn't more widely distributed here and in other places, but it certainly was not hidden in any way. That document was a preliminary document and the process we're going through now is an updating of that and ultimately the Environmental Impact Statement which we will be preparing as part of the FEARO process will replace and substantially enlarge that document. We are in the process of trying to give you details here today. I don't know how much longer the session is going on, but certainly the intention is that we will give you more details of the project during the course of this workshop.

QUESTION: I just think people should be made aware of the fact that they're getting very one sided views of the health risks from the people who have been brought here to serve as resources for this meeting. I really think it's dishonest in a way that the people who are telling you that there is no problem with health risks, that they don't admit that there is a large and growing number of doctors, specialist researchers, who are proving more and more all the time that there are more health risks than people have previously thought. I'm holding a summary of one report in my hand, it's no use comparing one summary to somebody else's summary. The two points to be made are: one, there are a lot of people out there who are now proving there are a lot more health risks than the Canadian government is willing to admit, and number two, that people who organized this meeting did not bring any of those people here. The only two specialists who are criticizing the government's position are the two people that the Regional Council brought in. There's an awful lot of people out there who would like to have been here if we'd been able to (word unclear) them to come up. Also the information that the regional bodies are going to be sending out, which will be translated, will be in the newspapers, and will be in flyers,

we're going to be presenting some of that information, and I would really like it if the specialists here would admit that there's an awful lot of people out there who would like to have the chance to argue with them in front of the people of Baker Lake and show them proof in a medium like this that their facts aren't quite the facts that they think they are.

MS. LETOURNEAU: Okay, if you're talking about health risk, which is the dose, then let's get technical about the dose conversion factors. Right now (word unclear) there are a lot of people who are contesting some of these dose conversion factors. However, at the moment the conscensus is that the dose conversion factors that we're using right now are conservative. The world wide scientific community judges that right now the dose conversion factors that were used are judged to be conservative. Now, you are always going to have some people saying no, they're not and they'll present their arguments. That's science - you will always have a challenger to something that's existing right now. The AECB is right now in the process of reviewing those studies which are challenging the present dose conversion factors. We're reviewing them, but, we haven't changed our present dose conversion factors. After our review maybe we will, but right now indications are that the dose conversion factors that we're using right now are conservative.

CHAIRMAN: Dr. Mackenzie.

DR. MACKENZIE: Ladies and gentlemen, Mr. Chairman. I don't propose to argue about the amount of dosage that's put in various regulations. There's another way of looking at this, and that is to look at the actual risk factors that uranium miners have experienced. (word unclear) anybody like today, and it's going to take a fair time before we find out what sort of risks he once had. A non-smoking uranium miner who has been in the mines for a period of time runs an increased risk, but a small one. The figures are something like 1.3, one and a third times as much as somebody who didn't go anywhere near a mine and didn't smoke, he'd have a risk of one. If he has been a heavy smoker it can go as - and had been there for about 18 years, and they'd probably been exposed to radon and things - as a class of people that work in mines, that risk goes to about 13 times what a worker, just an ordinary person that doesn't smoke in the community would have. There is an increased risk of essentially carcinoma in people who work or have worked in uranium mines. This doesn't mean everybody who works in uranium mines gets sick by any means, but that is another way of looking at it.I don't know

what dose they got, but they even work that out a bit, but there is this increased risk.

CHAIRMAN: Okay, we have another question.

QUESTION: (Inuktitut)

CHAIRMAN: The question, Carmel, is what about radon gas?If a caribou was touched by radon gas and the lady ate the caribou, what would be the effect?

MS. LETOURNEAU: As Bernie mentioned this morning, the problem for members of the public and also the environment is not radon gas or radon daughters, that is a problem for occupational workers. For the caribou it would be the dust, uranium, the radium, thorium, pollonium, lead and all those things. Now, if the question is what - again this morning we went through the pathways, these will be transported by the air pathways, deposited on the lichen, caribou will eat the lichen and then the people will eat the caribou. Now I think to answer that question I would have to know what the releases from the mine will be. I don't know what the releases are from the mine. (word unclear) we can only compare again what we see at other mines, like, again, what we see happening to moose, and if that particular situation is or is not a problem. However, I cannot say it won't be a problem with the caribou because we don't have those things yet. Hopefully we will.

MR. ZGOLA: Again I'd like to say that we should develop data on caribou. Moose aren't caribou and caribou aren't moose, they don't eat the same things and I think we need data from caribou. However, what I would like to say is that the products, be they dust, be they the products of radon gas and their daughters, don't appear, in any of the data that we have, to extend beyond a mile and a half, two miles, ie. three kilometres if you will, from the mine. Of course, it gets to be more of a problem the closer you get to the mine, generally. I would think if you keep the caribou two kilometres, a kilometer and a half, three kilometres away from the mine, then chances are you won't have any problems.If they get any closer than that, you would have to do a study and confirm that something isn't happening to the caribou. It is unlikely that something will happen to the caribou. What could happen is the caribou would eat the lichen, but it would not hurt the caribou. It might be concentrated within the parts of the caribou, and then it might adversely affect a human who ate it.

MR. CURLEY: I don't think it's our business to say I think this would happen or that could happen.We should all say we're not qualified to speak on the subject. I don't

think (few words unclear) to speak on the subject of radiation, in my view. He's a regulator - he shouldn't be saying these things in my view. He should be non-biased, never fully (word unclear) in the public hearing, because it's supposed to be regulated in the industry. Stringent regulations to protect the interests of the public. Not the industry so far, but the public and the environment. That is his business, not to promote it. I don't think Mick needs him to promote uranium mining in the Northwest Territories. He should know that.

We need people, people in the medical profession. I know that the B.C. Medical Association has taken a public position that they're opposed to uranium exploration and mining because of the increased health factors involved. We're up here, you know, we're making a case here although we don't know anything about cancer causing effects and radiation, wildlife and the people.I'm sure there are some facts, known facts, that document, with increased level of cancer and radiation, and maybe through the lungs of some of the people that are working in the country or for other countries, surely there is some evidence. I don't think that's a new - I don't think we're re-inventing the wheel, that we have got to now study the caribou. I know that Dr. Gormet(?) has made the statement to the Legislative Assembly, in 1982, that through the food chain, some of the effects could occur with a burst(?) of caribou in the population. I also saw a tape not long ago. It talks about another effect that could happen with respect to increased levels of radioactivity. I don't think we should be dealing with that. I think we should bring in the medical profession who have done extensive research who can (word unclear) reports, rather than using the word I think, and I would recommend that next time this guy sponsors a workshop that he brings in independent doctors, in the medical profession, with proven records in that area. That's what the public wants and I think we deserve to treat the public in a fair manner. Otherwise we'll be deceiving the public that this kind of thing is not harmful.

The government has the responsibility to protect the public. The industry has to be asked that it be sincere in its attempt to try and develop a project that would have an adverse impact on the environment and the people.We're not like these guys anymore. We can go down to the shopping mall and maybe a meat market, and have your choice of buying a fish, all kinds of poultry and meat. Our shopping mall is right near his Kiggavik proposal. I don't want to call it a mine, it's a proposal. From that perspective we've got to start treating this issue as

serious, and that there are known facts that it has done a tremendous damage to some areas. Inuit people - if you don't have anywhere to go for lunch, and I think we should go to lunch with some of the panel (word unclear), and choose and get a dose of caribou meat. Tomorrow for lunch you're going to start to realize how important this proposal is from their context. Because they're not going to go down to the shopping mall, get on this highway to, you know, two or three miles to different shopping malls and meat markets. Their meat market is out there - twelve months of the year - that's why they're concerned. They shouldn't be deceived by people like these guys from Atomic Energy Control Board saying, don't worry, we have regulations that will protect these kinds of things. I tell you they're worse than the marriage licence. They don't have any teeth into them.

CHAIRMAN: I see we have another question, but Tagak, I'd like to make a comment on your comments. I hope that firstly you don't think we're all here to deceive you, because we're not. We are here to tell you what we know about uranium and radioactivity, and I'd like to think that we know about, not personally, but these ladies and gentlemen that we've brought up here, know a fair amount more than the people that might not have been regulating the industry. To regulate an industry you have to learn about, you have to get control of the facts and figures that have been dealt with. I realize as Carmel was saying, and Bernie will certainly agree with me, that there are other professionals that disagree with us. However, we have a source of people available, which are mainly the regulators, who we used to bring up here. That was a conscious decision to get these people up here, because we thought they would know what was being discussed. Okay, Mr. Harding, Dr. Harding.

DR. HARDING: Well, if we are to trust the statements of regulators, then we ought to look at how the mines have been regulated, and certainly the experience of some of us in Saskatchewan has been that once the inquiries were over, and the public attention to the mines disappeared, and information from the north became more difficult to get to where the television and radio might decide it was worth reporting, that there began to be questions about the regulations, and I want to give you one example. To some extent it shows the flippant way that northern environments can be viewed. Now I'm not personally saying all regulators are flippant about northern environments, but the Key Lake Mine, which by the way was created by a company that is associated with the same company that's proposing this mine, Uranez in fact went so far as to dewater lakes without provincial

authorization, and there was a fair amount of public concern among environmental groups that in fact they didn't even have provincial permission to drain lakes but were proceeding, and rather than the Attorney General laying charges, which were clearly acknowledged to have been broken, and to me that's a major - I mean, you don't go into somebody's urban back yard and sort of drain their little fish pool without taking a chance of getting a municipal charge. A lake was in fact being drained without provincial authorization. What the Attorney General did, because they wanted uranium mining to go ahead and they believed there was going to be big bucks...(I can talk about how small the bucks were in fact, if you want to talk about that later.)...is he gave them retroactive legal authorization to do what they had done illegally. The Environment Minister was caught in a credibility gap and ultimately he did fine the Key Lake Mining Corporation $500 for engaging in lake draining without authorization under the Water Resources Act. Now, they watch themselves perhaps a little more closely because they're watched a little more closely, but the regulation, it seems to me, is only as good as the public is at watching the regulators. I'm sorry to say that, but I certainly don't feel that the regulators in this area have sufficient distance from the industry to be trusted. They're like that. They come out of the same background. They come out of the same jobs. They come out of the nuclear industry into the regulatory industry. This is very common.

MR. ZGOLA: No, I did not.

DR. HARDING: Pardon?

MR. ZGOLA: I did not.

DR. HARDING: Oh, this morning you said you were in the industry for twelve years.

MR. ZGOLA: No, I was with the Board for ten years, and in the industry for twelve years.

DR. HARDING: Many of the people though do cross back and forth between the industry and the regulatory system. It seems to me that the public have to watch the regulators for the regulations to be done well.

MR. ZGOLA: That I agree with.

MR. STUART: I would just like to correct one comment, that is, two comments, that Dr. Harding made (word unclear). One is that one of the Key Lake companies is associated with Urangesellschaft, which is not the case. It may be an understandable mistake as the

names are somewhat similar, but it's not associated with Urangesellschaft. The other thing that surprised me was the figures that he gave me, that he gave the meeting earlier on, of the northern employment in uranium mines, which I think he indicated was 15%, it's certainly my understanding--

DR. HARDING: Native northerners. Northerners are about 30%.Half of those are native.

MR. STUART: Okay, so you're saying that the northerners are 30%.

DR. HARDING: Yes. They're mostly, many non-natives are in the mines.

MR. STUART: Yes, but they are from the north. Okay. Thank you.

CHAIRMAN: Can we - question, yes.

QUESTION: (Inuktitut)

MR. STUART: Well, I'm sorry that you have not been able to get a satisfactory answer, in relation to the studies on the caribou. The tests that I think that have been done on moose in southern Canada were done in areas where mining had taken place, and these sort of tests cannot take place before the event. In other words, you cannot test the effect on the caribou as they did on the moose unless you have the mine in place, so that type of test is not possible. What has been suggested is that the condition of the caribou at the moment should be established, and certainly I would agree with that, and we have already done studies over the years on caribou, not by killing these animals and examining the content of radionucleides if any, but there are certainly studies that have been done and the sort of, the only way that we could simulate, or make a similar test to the one that was described earlier on moose, is by monitoring the situation now and then seeing what effect there would be once mining starts.

MR. ZGOLA: Perhaps Ron and Cliff could help me on this, but I think there are caribou in the Beaverlodge, Laredo, Gunn area, and there have been tailings there for many many years. Perhaps it would be useful to jointly fund with other agencies, get some people to go in there, and take caribou meat samples the same way as we did with the moose in Elliott Lake and have them analyzed.Are there any caribou in the Beaverlodge area?

NEW SPEAKER:(Inaudible)

MR. ZGOLA: They're not consistent that you would have them there. It's just a thought.

CHAIRMAN: Chris, I think you've been waiting long enough.

CHRIS: Thank you. You said earlier Bernie, that you thought going on the evidence of moose down in the Beaverlodge area, Elliott Lake area, that you felt that if the caribou could be kept one or two miles or one or two kilometres from the mine, that they probably wouldn't be affected by the dust. In the Elliott Lake area it's forest, there's a lot of vegetation there to catch all the dust. It goes up and it comes down to the ground maybe two miles away at the most. But up here there's no vegetation. The vegetation is very thin on the ground, and at this time of year the land is very very smooth, and I would have thought that any dust that falls to the ground can go a very long way. I'm just wondering if any thought has been given to that, and what impact there might be on caribou from dust going a very long way.

MR. ZGOLA: That's a very good point, but dust is also a phenomenon of the types of conditions that you have - wind, whether the earth is frozen, whether it's wet. It's a very complex issue. The other thing is you have to recognize that dust spreads from a central area, it's concentration will by nature become smaller the further out you go on the circle. Although perhaps dust may be spread further here than it would be in Elliott Lake, and I think you've made a valid point, the amount of dust, because the tailings areas or the mine etc. might be smaller than it is in Elliott Lake, the effect might be the same. These are the types of things that I think the company should be giving everyone data on, to all the agencies, all the regulators. Indeed, I think these are the types of issues that should be covered thoroughly in the FEARO hearings. I would also say that perhaps these experts, medical doctors, etc., a good place for them to come and give their opinions would be at the FEARO hearings. I don't know if that helps you but it's the best I can do.

QUESTION: (Inuktitut)

MR. STUART: I think this is a question for you. I certainly don't have the documents on the Elliott Lake study.

MR. ZGOLA: This was a study done by the AECB by, I think it was Laurentian University in Sudbury, on contract.As I mentioned this morning, any one of you who wants to leave me your name and mailing address, I will send it down to you, as many copies as you want. These are all public information documents. Any research that is conducted by the AECB under contract is available to the public. All you have to do is ask.

Unfortunately I didn't bring any with me.

MR. CURLEY: I think it's important that there are people from the Department of Renewable Resources and they should be paying pretty close attention to what's being said, because it's a shame that the Government of the Northwest Territories lacks, or has very little scientific data, (few words unclear) area and are concerned with respect to the environment. There's hardly anything to grab your heads with from the GNWT when we get to scientific and radioactive problems. But I think there have been a number of studies, like if you guys went back to your research, libraries or whatever, you will find that there are tremendous laboratory tests that have been made with respect to mines, with the radioactive contamination. (few words unclear) A statement has been made in the Legislative Assembly with respect to that. Eventually we'll probably see that 200 years from now the level of cancer would likely increase. I think from now on that Public Health should register people around this area and keep track of them, for the next ten years, as far as I'm concerned. Otherwise how are we going to know that the increased level of radioactivity in the people's lives up here will be the result of the project or whatever. I want to say this publicly and it could be checked, I don't consider Bernie's statement with respect to the moose being safe. It should not even treated in comparison with the caribou. It should be dismissed because a moose depends on a completely different food altogether. They eat the type of food that grows from the roots up, right, which they get from the marsh. Caribou don't do that. They eat lichen which depends on the oxygen, air, to grow. Information that I got from Dr. Gorman(?) why, that these particular types of plants tend to absorb a whole lot more radiation than the plants that depend on only their roots to grow. That's something that should probably be looked at by the Department of Renewable Resources people. Try and get that fact by doing at least a little more credible study, because it's something that the people up here depend on. I want to make that point, because I think that to compare that with a moose, by comparing (few words unclear) person, two different types of animals and human beings altogether.

CHAIRMAN: Thank you Tagak. I think Bernie and I both agree that they are two different animals, and Bernie did point out that this is just one study done in Elliott Lake, but he did recommend that we should do other studies here because of the difference that you pointed out between the feeding habits. Doug Heard, caribou biologist with Renewable Resources, would you like to make a comment at this point?I hate to put

you on the spot.

MR. HEARD: I'll just say that the only research I've been doing is on measuring radiation from fallout, and that it's a separate question as I understand it, there are different kinds of contaminants than we'd expect from mine dust and other pollutants. We haven't been collecting that kind of information and it could easily be done, but we certainly haven't looked for it. One of my concerns is that we all know that caribou move an awful lot and if we did a lot of collection and a lot of measurements, we may find very low values during that collection period, but then at some time in the future more caribou could spend a much longer period of time near the minesite and so what we find one year may not reflect what we might find in the future, because caribou are so mobile and exhibit so much - they can be all around a minesite in large numbers one year, or some years, and then not around the minesite in other years. It's not going to be that simple to collect information and say there is no effect, there is no uptake of contaminants by caribou. At least that's the way I understand it. Looking at it the other way around though, if we did look and we did find high levels or levels high enough to cause concern, then that would have been worthwhile. So one sort of result might be useful; the other sort might be more difficult to interpret. That's all I have to say.

CHAIRMAN: Thank you Doug. Dr. Mackenzie.

DR. MACKENZIE:(Inaudible)
(end tape side #10)

MS. LETOURNEAU: ... is to health safety, security and environment.

DR. MACKENZIE: In the Keewatin, Inuit cancer is the second cause of death. The first cause of death - right now of course, is accidents, misadventure of that sort, that's well out ahead. Cancer as a second cause of death is unusual, particularly in the young population, most of which you are. The other thing that is interesting is that in the north generally, right across the Territories, the cancer rate is higher than it is for the rest of Canada not much, but higher. One particular type of cancer has taken off here and is rising very rapidly, and that is cancer of the lung, and that is pretty well due to smoking. The other one which I find a little unusual that seems to be very prevalent and regular in Keewatin people, is cancer of the nasal passage, the nose and the throat (few words unclear), and that is probably also due to smoking. The other ones, concerns in the other parts of your body, are rising

slowly since about 1950, or I would think to be a little more accurate, that's about 1960. In most other parts of Canada they've been pretty level. What is particularly missing is cancer of the breast - keep it that way. It's a nasty disease of women and they don't seem to have that yet. That's where you are now. The mine coming in isn't going to necessarily improve the situation. It's not necessarily going to be the cancer disaster that you think it is. There are a lot of other things that can happen with regard to health when you get industrialization in an area that hasn't been industrialized before, and we'll maybe talk about those later, but for cancer, you're high now, (relatively) for Canada. You've got some cancers that are going up. All your cancers are going up, some are going up alarmingly, and I think that if mining of any type, or any kind of industrial activity is anticipated here, one very good thing that you should push the Department of Health for - I'm not with them, but I've been talking to them and I think they'd be very interested - would be to get a survey of your own health now, just like you want to do with the caribou. This can be cheap and easy and quick or it can be quite elaborate and quite fancy and more costly, but we're not talking much, approximately ten to $300 a person. The army does this and they know who's got what. Then as things change, you'll be able to find out what's happening to your own health, whatever the reason. You can always put reasons to what goes wrong in health. It's not that easy, but you can get some pretty good ideas. That would be one thing that I would urge you to put forward. Unless you have personal, serious objections, I don't think anybody is going to make any one of you do anything you don't want to do, but I would put that to you. Get your own health monitored now and against future change, because you do already have a problem which I can't entirely explain (word unclear) as to why cancer in the north is higher than it is in the rest of Canada.

CHAIRMAN: Thank you Dr. Mackenzie. I guess that fits in with Mr. Curley's comments that maybe we should do a health study of the people of the Keewatin. We have a question over here.

QUESTION: (Inuktitut)

MR. STUART: The employment at the mine is part of the study that is being done right now, and we do not have final figures on that yet, but I think I can be reasonably sure that they will not be too different. The employment figures at the mine are expected to be similar to what we suggested in the pre-feasibility work of about 250 people. That's the total employment, and those jobs are made up of a variety of different activities. I believe that somewhere in the region of about 100 of those jobs could possibly be filled by people with relatively little training. These are a variety of jobs - mobile equipment operators would be one of them, and those are the sort of jobs that there is experience from in the Keewatin amongst people who have been in construction, and quarrying work and I'm sure there are experienced people right now, and others who could be trained very easily. Other jobs that could readily be taken up by the local people are in the field of apprenticeships to the various trades groups, and certainly we would be planning an apprencticeship scheme in connection with the project. There would also be opportunities for people to work in the plant, and that would be when we would need to have trained, a considerable number of trained people, people who had worked in plants before. However, we would (word unclear) see on-the-job training for quite a lot of people without previous experience. There are a variety of clerical jobs, and we would hope that some people could be trained in the various environmental jobs that have to be done in connection with the project. Ongoing monitoring of the project would be part of the mining operation as far as we are concerned. This is the variety of jobs which we think would be available to local people. Now I'm not saying that all those jobs would be available, because this is a two-way street, and the main thing about these jobs is that they will be a different type of work than the customary work that people are used to in this part of the world, and any kind of industrial work is a little bit different, there's a discipline to it, and a routine to it that is not everybody's choice. However, those jobs will be there and we would certainly hope that a considerable number of local people, particularly in Baker Lake and in other nearby communities, would take those jobs, and we will provide training on-the-job for them. As we've said earlier, the type of work would involve commuting. It would be what we call a fly-in, fly-out operation, so that people could return to their communities after a period of work for a period of rest.

QUESTION: (Inuktitut)

MR. STUART: I'm not sure I understand the question. The uranium ore bodies that we have been talking about, the known reserves of uranium minerals, are located in two bodies right at the Kiggavik site. Perhaps you're referring to my comments earlier that there are indications of additional reserves, and these are in the general area of Kiggavik.

QUESTION: (Inuktitut)

MR. STUART: Are you referring to the two ore bodies that we have at Kiggavik? Okay, now we've got it. There are two ore bodies and they comprise the ore zones which we have within our reserves at the moment. There are about six hundred metres, or roughly two thousand feet between those two ore bodies, and I think we will be discussing them in more detail tomorrow, or tonight if you're still anxious to go on, which I don't think you are, and some details about the mining at Kiggavik.

CHAIRMAN: Thank you. One more question, then we'll call it quits before our interpreters fall over dead from dryness. Well, maybe two more questions then.

MR. CURLEY: Mick, I didn't really get your answer to the young man's question there. I understand you've been working around in that area for at least fourteen years. My question is, and it's going to be a simple one. Even if you don't have it I'm sure you can get it from your office, because I know that your office is very close by phone. Okay? My question is, can you give us figures by tomorrow as to how many trainees and how many people you're going to employ from this region who are not trained, and at the same time how many trainees are you going to have? Can we have this in the figures in front of us from you tomorrow? Would that be possible?

MR. STUART: I told you that we don't have the final answer yet because that is part of the study that is still in progress. However, I can give you tomorrow some numbers which are my estimates of the sort of jobs that I think, as I said, people could take up either with no training or with a small amount of training.

MR. CURLEY: Okay, that answers my first question. Going back to another question I had here, way back to the regulations and regulators. I understand that when the mine is in operation, it has to abide by the regulations, and that when the regulations are not abided by, then the people who regulate it usually do a follow-up on it. Now, that old man over there just

said that maybe it's better for Inuit to get a medical check up right now and find out later on as to when they - I believe my understanding was that when the mine starts and when it's been in operation after so many years, that we can find out whether the cancer or whatever is going up. Let's say, in a few years, like let's say the mine starts tomorrow. Ten years down the road the cancer or whatever, some kind of a disease, increases and from there we can tell where it's coming from. For that reason, can we get compensation for that? Would we be covered for the compensation or whatever?

MR. STUART: I know I don't have the answer.

DR. MACKENZIE: I think that if that could be proven, that it was definitely as a result of the mine, the likelihood is you could get compensation, yes. That is the normal situation.

MR. ZGOLA: The uranium mining regulations of the AECB, and we're talking orders here now, requires, if you read the regulations - I can't look at them right now, I haven't got them with me - requires pretty extensive medical surveillance of the workers by the company, and it's a matter of regulation and law. I don't know what the situation here is north of 60, but south of 60 you will have workmen's compensation boards which have paid out money and are paying out money to workers who have made a case that they have suffered from cancer or other types of problems from uranium mining.

CHAIRMAN: Okay, last question. Mr. Hicks.

MR. HICKS: When I was in Toronto recently I met with a doctor who is probably the world's leading expert on the health effects on human beings, not just from uranium mining, but from all the uranium cycle, the big bombs, nuclear power plants, and I asked her, say if we wanted to do a health study of the Keewatin, and we wanted this to be a really professional study, like the best we can get, right, and we wanted it to be so, so solid that no doctor, not even government doctors, could find any problems with it, ie. undeniable proof of where people were healthwise before the mine started, how long would it take to get that information. She said a minimum of twenty years, because of the small population in the Keewatin which makes it more difficult statistically, and there's almost no health records, unlike down south. A minimum of twenty years to get the kind of health base line that you could take to court later. She said the single biggest thing you have to beware of, because the companies are getting, you know, they know you're going to be asking for this sort of

thing, is companies and government are going to say, we can do it one year, or we can do it in six months, we can get enough information. She said don't believe it. If you don't have this extremely high quality data, which would take at least twenty years to get, it'll be useless to you later when you go to court. Because, Mick made the point, if it can be definitely proven that someone died or had some health effect as a result of uranium mining, it's very difficult to prove definitely how someone got cancer. In fact, it's almost impossible. All you can do is look at trends. I think we should all think about that.You know, I don't know if Mick is willing to wait twenty years to start this thing, but she said if you don't have that kind of information, you won't have a case when you go to court. She's coming to Rankin Inlet in the middle of April, and if people in Baker Lake would like her to come here, I'm sure we could arrange that if you like.

CHAIRMAN: Dr. Mackenzie, would you care to comment on that?

DR. MACKENZIE: I think that would be just lovely to have twenty years of data, and it would be very important, and I think I would like that. I was maybe thinking of being a little more practical and knowing I don't control the universe, that at least if we had baseline data now, that if something occurred, we could perhaps stop it or help the people who had it, which is politically sort of a matter of getting compensation, but that would be that. Certainly I agree that to get a really good trend of health in a population with the sorts of trends we have now as far we can see of rising cancer rates, different from other areas, that this would be excellent. It would be very good for you even if they didn't mine uranium afterwards. I mean it would be a very useful thing for the community and the people, but I didn't suggest that. I would have loved to. I didn't suggest that because perhaps I'm a little more aware that I can't control events. People are going to do what they're going to do. I'm trying to think of the best that we can do now, but if you can get that, get it.

CHAIRMAN: Thank you Dr. Mackenzie. I think this should be it for tonight. We will be convening tomorrow at nine or nine thirty, nine thirty to give our interpreters a little bit longer to rest their voice. So I'll look forward to seeing you again tomorrow.

ADJOURN.

RECONVENE:

CHAIRMAN: I guess we will resume our discussion and information distribution. Before I go on much further, we just had a new government regulator join us, Mr. Dennis Lawson, who is working with EPS in Regina, and he's put out two publications at the back. One is a list of Environment Canada's work on uranium mines and uranium mining, with all the papers they've prepared, and I'm sure that he can supply you with the papers if you find some that are of interest. There's another fact sheet on the metal mining industry. Again, that's at the back.It describes Environment Canada's role in regulating metal mining. We also have Mr. Paul Scott who is with the FEARO panel. He's the chief clerk, (few words unclear) he's got a prettier title than that, but he's also brought in some information on the FEARO panel; a newsletter that has been put up on the back in the yellow boxes. If you remember, yesterday we were going through the sequence of uranium mining operations. We've briefly done infrastructure, showed you pictures of mines such as Rabbit Lake, and we started talking yesterday, last evening, on mining and ore processing. Mr. Barsi of Saskatchewan's Environment Department was going through that, and describing a number of the operations they have in Saskatchewan. I think I would like at this point to ask Mr. Barsi to come on back up, finish that section on mining and ore processing, and then we'll have Mr. Mick Stuart, Urangesellschaft, come up front and describe how these relate to what they have planned for Kiggavik under the field of infrastructure and mining and ore processing. He'll give us a few more details about what's described for Kiggavik. Ron.

MR. BARSI: Good morning. What we'll do is I'll just quickly recap because there are some different people here, the mining that I talked about last night, and then we'll discuss the ore process. One comment I wanted to make is that at Rabbit Lake a lot of the native employees work in the mine. You know, there are, other native employees around the site, but the majority of employees are related to the mine. A suggestion that you might consider is to, during the FEARO Review Panel, is to get some of the employees up and talk to them, and then they can speak for themselves as to what they feel about working at a mine or what they see at a mine. There's no one else that can speak for them, other than themselves. They can tell their day to day story about working at a uranium mine.

Okay, with mining, they break the rock, for example at Rabbit Lake, by blasting. They drill the rock, they put dynamite or anfo explosive, and they blast the rock. Then they haul it out of the hole with trucks and it's put into an ore storage pile, then it's crushed into small pieces and then it's ground

into sand sized material. It looks like sand. Then it goes through the mill where the uranium is chemically extracted, and tailings, which is the left over sand with the majority of contaminants in it, goes out to the tailings or the waste disposal site. On this one, the old Rabbit Lake tailings are back here. Cliff will show you some detailed pictures of that structure later in the agenda. This is another picture of the hole showing where the waste rock goes, because not all of the rock is economic. Some of it is waste, and that's placed over here. Like I mentioned last night, part of the piles, the old waste rock piles, have been revegetated and you can't tell them, when you're looking their way, from the background vegetation.

Again, those were the trucks that they were hauling out the gravel with. It's scanned up here with an instrument that measures the radioactivity and then they can judge the economic, or the ore grades of the rock they're bringing out. If it's economic, it goes to the mill. If it's not, it goes to the waste rock pile. At the Collins Bay mine, which is their newer one, the pit is over here. The rock is hauled over here and it's scanned by that instrument right there, then the truck either takes it to the waste dump or to the ore stock pile. The ore stock pile is totally lined by a heavy black plastic liner that is about one eighth of an inch thick. All of the contaminated water - off here you can see some melted snow - is collected in a drainage ditch and is taken to the mill for recycling or for use. Just for interest's sake, this is the airport back here. The waste rock pile normally has no problem as far as water quality is concerned. However, just as insurance, we've asked them to put in a drainage collection system, and water goes underneath the road and back to the pit for re-use in the mill.

The other thing is that any facility built up there, at any of the uranium mines, as the surface water (word unclear), where clean water is directed around and away from any areas that they possibly can get contamination from. This photo shows fairly clearly that there is a difference between northern Saskatchewan and the Baker Lake area. These trees are probably the height of the ceiling here. That's about the height of trees you see here, and shorter. Very rarely are they taller than the ceiling here. Similarly, this is Wollaston Lake out in the background, with the trees and everything, they're pretty well the way you see it. The muskeg is here. This is the pit, the Collins Bay pit, where they're mining. They bring it up here. This is the lined ore storage area, and this is the waste rock area. These are the workers installing the liner that went

under the ore storage area. You can see here that the plastic is fairly heavy material. This is basically a plastic welder that melts the plastic at the junctions, and then they have an air lens method of testing the joins to make sure that they're good welds, that it's a continuous sheet of plastic, and they do it properly. This is the collection ditch around the ore storage. This is what the liner looks like underneath. This is ore. That's the scanner back there to check the trucks, and again the plastic is all underneath, so any contaminated water can't go through and into the ground.

This is what the material looks like, the rock, what they call pit run material, straight after blasting and hauling. They take that material and they haul it up to the mill, then they blend it to get the right mix and it's fed into the mill through the grizzley, then it's crushed again to get smaller, then in here they grind it, get it smaller, down to sand. Then they do a bunch of chemistry in here to extract the uranium, and I won't speak about that because every mill is a little bit different. Mr. Stuart can describe what's going to happen up here in their mine. These are big tanks that are just part of the chemical process for extracting uranium.This is the tailings pipeline that takes the waste sand out to the tailings pond. When you see big tanks like that, there's a lot of liquid in each one, so there's potential for spills. All of the sites around the mills are contoured for slope in towards the building, so if they have an accident of some sort and one of these tanks overflows at Rabbit Lake, the material runs back into the building. It doesn't run away out into the bush. These are the pictures I had to show up to the ore process in the agenda. Chris had a question.

Mr. O'BRIAN My question is, yesterday in the movie, in the video, it was explained that some of the radiation coming off the radioactive rock can be stopped by a piece of paper or a book, and the other kind of radiation, gamma radiation, was stopped by something thicker. I'm wondering if it's possible in a truck like this to have just low, very very low level or no level of radiation in the top layer of the truck, but maybe underneath, down on the bottom of the truck, have some fairly high level stuff, that this machine does not pick up. Perhaps this guy doesn't hear the horn or whatever, so he takes it over to the waste rock pile and then it gets dumped there, but in fact there was some high level stuff down in the bottom that this machine did not pick up. Is that possible?

MR. BARSI: The answer to your question is yes, it's possible. What they do though, because the company doesn't want

to throw out any - like you're saying, throw out this uranium to go to the waste dump, right. Now the company does not want to go to all the expense of mining uranium and then just throw it away. They want to get it into the mill. What some of the companies do, just about all of them, is since the uranium bearing rock is a different colour, what they do is they'll have a geologist down in the hole, and mark all of the ore grade material. He will tell the tracker loader where to go and get it, so a boulder say, or a rock or something like that could get into the waste, but when you're dealing with a geological ore body, there isn't a fine line, right. It grades from richer down to (word unclear) or very low uranium, so it's not economic. That helps them to judge where to make the cutoff, as to where to go. Does that answer your question?

(End of Tape side #11)

MR. ZGOLA: .... ore material to make it to the waste rock stockpile, and our inspections, I'm sure as well as yours, that identify from time to time that this does happen. The fall back position in a well run company is that the waste rock stock pile is scanned, if you will, on a regular basis to ensure that none of this ore grade material makes it to the waste rock stock pile.

QUESTION: Bernie's answer, that was in answer to my next question, so there's regular checking of the waste pile. He said that the ore stock pile will have a liner underneath.I don't know if, since this is permafrost country, are you - we'll hear about this later but I don't know if there's going to be a liner at Kiggavik - but do you also put a liner underneath the waste rock pile? I'm wondering if it is possible for some higher level material to get into the waste rock pile, and it seems worthwhile to put a liner under that as well.

MR. BARSI: Maybe Mr. Stuart can mention what their plans are for the waste rock and ore pile when he comes up next.

CHAIRMAN: Any other questions?

DR. HARDING: I have two questions. One is, have there been any problems with the original plan for dealing with tailings, at Rabbit Lake in particular. We could talk about the other mines perhaps later, and secondly what kinds of spills have actually occurred at Rabbit Lake.

(NEW SPEAKER - INAUDIBLE)

DR. HARDING: Well, the first question relates to some regulatory questions. Maybe I should give some background.

It's my understanding that the tailings to go into the original pit at Rabbit Lake were to have been made into dry tailings, and that they found that they couldn't do that, so they are now back to pumping. They couldn't move the trucks. It's also my understanding that the approval to do that may - I'll be polite - may have occurred before the Atomic Energy Control Board had in fact finished its review of the change in the method from what was approved originally, and I wondered if you could comment on that. My source is Maisie Shield(?). As people may know, Maisie follows you folks quite closely. She's a grandma environmentalist from Regina who digs into the records to see if things are really done the way they say they're going to do them in the inquiries.

MR. BARSI: Cliff will have more photos of the pit later so you can see what is happening with that tailings deposition in the old pit. To answer your question about the phasing, the original proposal was to put in a semi filtered slurry. It was still going to be a liquid deposition, buried in the density of the solids of the slurry.

NEW SPEAKER: But in layers to allow some evaporation so it was in fact (inaudible)

MR. BARSI: The company did experience a lot of practical operational difficulties with putting that slurry down there. They approached the regulatory agencies, both Sask. Environment and AECB, with a request to run a test to decrease the amount of filtration, like The amount of density, the amount of solids versus liquids in the tailings slurry. They wanted to do this test because they could not make the other way work, and they were granted approval to do that test. The test was run last year and they are measuring all of their data. They have given that data to the regulatory agencies. The regulatory agencies are reviewing it. Saskatchewan has also hired an external consultant to come in and give a third party opinion on whether or not the change is environmentally safe. This report should be available in about three weeks.

DR. HARDING: The other question is what spills are at Rabbit Lake. The thing that I think, having gone through this process in Saskatchewan for ten years and heard plans to deal with tailings waste and high level waste, because it's very high level waste in some of the mines in Saskatchewan. In each case when people have monitored what was said would be done and what is being done, there is a massive discrepancy. A comment was made to me by someone who has been studying this, that what is said in the inquiries by the mining companies and the mining engineers is

extremely academic. It's said largely to give the impression that they have a plan, but what is done at the minesite is ad hoc, in large part. We could go into Cluff Lake, Key Lake and Rabbit Lake, and there are major examples I think in each case of the Saskatchewan mines. These are used as examples to provide some sense of security that the industry knows what it's doing and proceeds on the basis of what's approved. I think there's very very strong evidence that what is said in the inquiries isn't very predictive of what ends up being done. This is because the conditions aren't studied very specifically, and of course this situation would be even different. It could be much different from Saskatchewan. However, if you could give a history of the spills at Rabbit Lake, that might be interesting.

MR. BARSI: The first thing I have to say is, I totally disagree with what you're saying. Totally. During public reviews when the mines - they're on paper, they're a design. There is nothing built yet. There have been changes to Saskatchewan mines, and many times the changes are at the request of the regulatory bodies. A mine is a living and growing thing. It has to change. If they have problems they have got to change their ways and do it better, and we have filing cabinets full of information, and we have done hundreds of inspections on these mines, and I am confident to say that all of the changes made the mines better than they were proposed in the first place, at the public inquiries. They have to do that. To sit here and say that a mine should be designed with a twenty year life and turn around and say that you're not going to change something in that twenty years, would be foolhardy. It is just an impossibility and it's the real world if that's the way you think it's going to be. As far as the spills. Yes, there have been spills at every one of the minesites. Again, it's the real world. We all know that people make mistakes and there are employees there. Things happen. Accidents happen. Mistakes happen. Equipment breaks down. It's a large industrial process - it's going to happen. What you have to do, you have to design into your system a way of preventing spills as much as you can; a way of containing a spill when it happens and to open a management structure, a training plan to make sure your employees know that this is an environmentally hazardous situation or an occupational health concern. You do as much as you can to prevent it. When it does happen you clean it up as fast as you can, and in the best way that you can. I don't know if there's any need to go into a description of each individual spill. There have been several at all of the minesites. Most of them

are related to pipeline failure. There are breaker valve failures, pump failures, and overflowing of tanks. We get a lot of fuel spills where the truckers offloading the bulk truck forget, go and have a cigarette or a coffee, and so overfill the tank, and it runs out on the ground. What they have in a situation like that is all of the fuel farms are lined with the same heavy black plastic, and then they can pick it up and put it back (word unclear). The Key Lake spill, which was the biggest spill that people heard about in the media, was not a significant spill, but we did not determine that until after all the investigations were done. It was mentioned yesterday that it was a tailings pond spill; that's not correct. The spill was in a minewater pond. The pond was overfilled during a transfer of contaminated water for recycle. The water went up to the top of the pond, started overflowing the top, and eroded away the embankment, weakening it, so that the whole side fell, and they lost a lot of water. The company was fortunate in the fact that there was a little pond, or as some people call it, Jail Lake, the water all went in there and that's as far as it went, because they had a berm across the other end of it. The company was asked by the regulatory agencies to pick that water up and put it back into the mill for re-cycling. There are two things to remember about that water that was recycled back to the mill in that spill, and again we didn't know that until actual samples were taken of the spilled water, that 1) the water that spilled was less than the discharge limits for Saskatchewan, and 2) it was also less than the drinking water standard. This is why we can say now - well, okay - at the time of the spill it was investigated by both levels of government, federal and provincial, then Saskatchewan also hired two external consultants to do third party reviews of their investigation, plus the company hired one of their consultants to come up and investigate the environmental impacts of that spill. All of the studies show that it was an environmental non-event.

However, that does not mean for a minute that the spill was a good thing, because it should not have happened. The company was lax in controlling their transfer of water from one pond to the other, and that is pure and simple bad management, and should not have occurred. Subsequent to that, we asked them to put in a whole raft of electronic alarms to back up the human reconnaissance going on at that minesite. Again, with all these electronic toys you cannot sit for a minute and say there will be no spills at a minesite, because it may well happen. Again, the onus is on the company to make sure that they've done everything in training their people and

in designing a good site, and then the regulators have to make sure that they're being inspected to make sure that they are in fact doing the best they can to protect the environment.

DR. HARDING: One other thing. Since you're talking about the other mines, you did make a statement to consider that all the changes were an improvement in terms of environmental safety. My understanding is that at the Cluff Lake mine, because of the extremely high, radioactivity of ore, the inquiry agreed that the thorium and radium should be separated from the regular tailings disposal, and it was put in cement caskets. Now I remember that section in the inquiry, and some northerners said that it sounded a little silly to use cement caskets in the northern environment, that they probably wouldn't last two or three years, but the mining engineers said no, they'd be fine. Now we're talking thorium with a half life of 76,000 years constantly producing radium, constantly producing radon gas. As it turned out, AECB in fact overruled the inquiry's decision that those should be separated into cement caskets and buried. They were going to bury that waste in hardrock, I suppose, or in permafrost, and the AECB said no, they had to keep those separate. They kept three thousand of those containers with extremely high level waste in them, and they began to crack. Two hundred of them as I understood cracked. Basically they had a high level waste problem at the mine for which the inquiry had not come up with any kind of waste management system that ended up being acceptable. What they have ended up doing is reprocessing that waste to get the gold out and putting the thorium and the radium back in tailings ponds, which the original inquiry said was out of the question. It was not environmentally safe. So that basically you now have high levels of thorium and radium in the regular tailings pond at the Cluff Lake mine. Now, I have trouble seeing that as an improvement. But what it really says is that sometimes there isn't a solution, or isn't an adequate method for dealing with the waste before the mine (word unclear), so maybe you could comment on that. I can't see how you would say that doing what the inquiry said they, under no circumstances, should do, which is putting a high level waste back in the tailings ponds, could be seen as a solution.

MR. BARSI: Just as a bit of background on that, the company had requested right from the start that they wanted to look at the ability to reprocess that waste that Dr. Harding was talking about, because like he said there was gold in it, and also there was a very large amount of uranium that they did not get with their chemistry the first time they ran it through the

mill. There was a lot of support from resource people that if you're going to go to all the trouble of tearing up the ground and disrupting the forest, to make sure that you've got all of the resource you can get. As far as the first part of the question goes, I think I should let Bernie maybe talk about the way he used your name in vain.

MR. ZGOLA: Not my name, the organization's name. It's interesting too, Dr. Harding, I think the reason the AECB told the company not to bury it was that they didn't want "out of sight out of mind" for a really higher level than normal tailings waste. In retrospect, I think it was an excellent idea because if the concrete containers didn't last three or four years, it wouldn't be very prudent to leave them in the soil and contaminate the groundwater. The decision was made to recommend, or to require that the company place in temporary storage, where the concrete containers could be monitored, the tailings if you will, or the residue from the first phase of the Cluff Lake project. When the company identified other ore bodies of lower grade ore and started to mine these ore bodies and create more tailings. There was a very detailed study done on what the impact of slow blending of these original higher level wastes would have been, when added to the further tailings in the second phase operations. There was a lot of modelling done; there were a lot of consultants involved, and a lot of experts involved in all agencies. The results of these studies indicated that the best place for those higher level tailings would be in conjunction with massive amounts of other lower level tailings in the control structure of the tailings pond. Only after these reviews were completed was the licencee permitted to proceed with the reprocessing of these higher level tailings. Dr. Harding or anyone who wishes to see all the reports, they're all available for his scrutiny, or the scrutiny of his consultants or experts, and I think both the AECB, Saskatchewan Environment, Environment Canada, would welcome any challenge to those decisions. Thank you very much.

MR. BARSI: One thing I'd like to add is Dr. Harding might have (word unclear) what happens at the mines as far as change is ad hoc, at their whim, all I can say is I think the companies would wish that's the way it was. Unfortunately for them it isn't because any time they want to make a change that will have an impact on the environment, like when it has to do with our agency, or a change in the mill that would affect the workers, they have to submit a request to do so and fully justify it. And this is why I can say with some confidence that it would not make any sense to anybody from a regulatory agency, whoever they may

be, to allow something foolish to go ahead, unless they can fully prove that it's absolutely better or equivalent to what was agreed to in the first place. Again, we've got - any time anybody wants to come in and see the submissions that the companies have made, they're free to do so, and Dr. Harding is right, Mrs. Shields comes in fairly frequently and sits down and we provide her the books to read. She's a citizen of Saskatchewan and that's her right. Now Maisie chose to dispute what the regulatory authorities decided with regard to the Cluff Lake situation that Dr. Harding brought up and Bernie just discussed, and she took the Province of Saskatchewan and the Cluff Lake company to court. I'm not a lawyer but my understanding of the outcome is that they chose not to make a decision on it, and I'm not sure of the legalistic reasons, what they were or whatever, but regardless of what decision is made, the company as well as the regulatory agencies and the people of Saskatchewan in this case, have to live with whatever decision is made. That is one of our primary reasons that we conduct monthly inspections of each uranium minesite. Through doing these inspections we can keep a very close tab on what the company is doing. If we find out that there is some activity or some event or environmental situation that is appearing we go up far more frequently than once a month, in some cases we have had inspectors stay within a minesite for a period of three months continuously, and that was after the Key Lake spill. I don't know what more you could do other than having a guy living right on the minesite making sure the company followed up after a spill situation like that.

CHAIRMAN: Thank you Ron, and I'd like to reinforce the fact that we do have the Water Board that will issue the water licence for any mine in the Northwest Territories, and any major changes to the operation of that mine has got to go through a public review process and pretty likely a public hearing. Not only uranium mines unfortunately have spills. At this point maybe we should have a coffee break and come back with Mr. Stuart who will describe what Kiggavik will look like.

ADJOURNMENT

CHAIRMAN: As I mentioned earlier, Mr. Stuart (few words unclear) ask him to make a comment. I'll do that and then we'll get on with it.

MR. HICKS: I just wanted to make it clear for anyone who wasn't here yesterday that the regional organizations had no input into the structure of this meeting. I know some people are unhappy with the way things are turning out. I just want to make it clear that the regional organizations weren't consulted as to how this meeting would take place. The other point that I want to make is that it occurred to me watching the presentation this morning that if we had, the regional organizations, hadn't brought in someone from Saskatchewan who knew the Saskatchewan story inside out, that all people would have received was a very nice slide show, showing a happy story, with no mention whatsoever of any of the problems that Dr. Harding brought out. I think people learned a fair amount, or picked up a fair amount from the discussion which took place between the person from Sask. Environment, the person from AECB and our resource person from Saskatchewan. If we hadn't insisted on bringing our own resource people, people would never have heard of any of those problems and I really want to question the structure of this workshop and how much people would actually have learned about uranium mining if there weren't at least a couple of resource people on the other side.

CHAIRMAN: Thank you Mr. Hicks. I guess at this point maybe I should mention that we plan to finish here by four and then have Dr. Harding and Mr. McKay make comments on behalf of - I presume it will be on behalf of the KRC and other Inuit organizations. Yes James.

QUESTION: The last - actually it's Pierre I want to ask this question to. Your last point regarding the Water Board, that they would be responsible for looking after the water provisions and preparing a water licence for the Kiggavik project. I'm just wondering if it could be a problem for the Water Board having had no experience with the uranium mine as to what extent AECB would be taking the lead role in probably all the licencing as it relates to water, in this case. I'm trying to figure out how we can best prepare for a blending of what AECB offers and the little experience the Water Board has in the area of uranium. Is this a problem, I'm not sure.So I guess Pierre, maybe you could comment, and maybe Bernie could fill us in on how AECB and Saskatchewan work together when it comes to hear about water quality. It seems so different in the north.

CHAIRMAN: I agree with you, James, the scene is different in the north. One of the factors in the scene is the fact that any mine operating in the Northwest Territories has a licence from the Water Board to use the water, so that will have to be done for Kiggavik like any other mine. As you know, the licences are arrived at by a committee of scientists that listen - first of all the public hearing is held, the Water Board listens to concerns of people, comes back to its Technical Advisory Committee which consists of scientists and regulators, points out the concerns of the people and these are worked into the licence. Since we are dealing with a new type of mine, a uranium mine, we will have the experts on uranium mining, Dr. Lawson and AECB, provide input into this (few words unclear) advisory I'm sure. As well (few words unclear) have your own system of licencing that would also be applied after the company obtains the proper licences applicable in the Northwest Territories.

MR. ZGOLA: (few words unclear)

CHAIRMAN: It's a process that goes both in tandem and in sequence. Okay Jeremy? Mr. Stuart, you can start this on Kiggavik.

MR. STUART: Ladies and gentlemen, we saw yesterday a number of things about the infrastructure, the mining and just briefly the processing at the uranium mines in Saskatchewan, and I want to describe in a general way what our plans are for Kiggavik. They have some similarities, and they have some differences. Before doing that, I would like to answer a question that was put to me just at the end of that rather long session we had yesterday in which I talked about the potential for job opportunities at the Kiggavik operation if it goes ahead. Once again I would like to emphasize that though we are of necessity making detailed plans of what we would like to do, those plans still have to go through a very extensive approval process. We are not going ahead with the mine. We are going through a feasibility study and an environmental evaluation process which has to be completed before we can start, before we can even apply for the necessary licences to start work on the project. All that we have at the moment are our licences which are appropriate for exploration. That's what we've been doing here for the last fourteen years.

To answer that question - am I going too fast? Sorry, I think I may have been progressing too fast for the translators. To answer the question on job opportunities, I was put on the spot as to just what sort of jobs could be available. I mentioned that we

have not finished the studies completely and these are only provisional numbers. These are the sort of jobs that I feel could be taken up by people from the area with a relatively small amount of training. There are really very few jobs that can be taken without some training, but I will give you the numbers which, as I said, are approximate and may change when we get the final study completed and at that time we can give you some new numbers, but right now we see the prospect of something like 25 jobs as plant operators. These would be amongst a larger group of people who would have to have training in this type of work. The people would have to have worked in uranium plants or mills of a similar nature in other places, and so we probably could not find them here. There could be about 25 people without that experience who would be brought here probably before the plant starts to begin a training program, and who could eventually become plant operators.

The other major area where I think there is good job potential is in what we call heavy equipment operations, which is I'm sure a job that means, is quite meaningful to everybody here. We have, as we've said, an open pit operation planned and this is not very different from quarrying operations, or construction jobs, which I'm sure all the communities here are familiar with. The equipment we would use is somewhat larger but it's of a similar nature, and I feel that at the present time there are probably quite a few qualified people available here in the Keewatin, and that within quite a short training period we could train others who may not have had that experience.

We will need certainly a fairly large group of tradesmen, of electricians, of mechanics in particular, heavy motor mechanics, welders, millwrights. These people, these occupations are always hard to fill (end of tape side #12).

... we have heard that once you start an operation you don't just leave it at that. You monitor a situation all the time. Just one second, let me finish. In addition to that, you would see probably about six or eight people who would be employed at our dockside on a seasonal basis. This would not be permanent, but it would cover quite a considerable period of the year. That I think totals about 90 people, and I think that was the figure I gave you yesterday. Was there a question from the floor?

QUESTION: Mr. Stuart, very interesting. I'd like to hear more about environmental protection. It's the Kiggavik mine for a start in Baker Lake. What I'd like to hear about are the environmental services and river

runs which start from Baker Lake area right through Keewatin, and the jobs you talk about should be last I think. The first thing I want to hear are environmental services. Thank you.

CHAIRMAN: Okay, there will be some talk on monitoring environmental impact, and I think at that point we should cover all the questions you might have. Mr. Stuart was just answering a question that was asked yesterday. Can we proceed with describing Kiggavik, and we will come back, I promise, to the environmental monitoring. We have a number of people here that are experts in the field that can tell you what will be done.

MR. STUART: I can assure you that we understand that that's important. A certain agenda has been set down. We will be talking in considerable detail about that later on today. Is that fairly clear to people at the back? The first part we want to talk about is infrastructure and I'm starting off with this rather small scale diagram covering a large area just to indicate the relationship of the project, Kiggavik, to the general area, and in particular to the outlet to Hudson Bay. Again, I have to apologize that this is only in English and as the translation takes place I will just try to identify various items I'm going to discuss on the diagram by putting my pencil on it. We see here the outlet to the bay close to the hamlet of Chesterfield Inlet. We see over here the location of the project and we see here -- Okay, the map is a bit closer. This morning it's easier to do that. Okay, you find Chesterfield Inlet there, Kiggavik right here, and in between, the hamlet of Baker Lake, which is here. You're probably familiar with this, but it's good to get some idea of what we're talking about. From here to here it's about 250 miles. That distance is about 50 miles. I'm now going to show you a blown up picture of this area here.

Over on this side you can see just the edge of Hudson Bay, Chesterfield Inlet, Baker Lake hamlet, and the Kiggavik site. Dealing with infrastructure in this part of the world is a rather different situation to that of Saskatchewan, because the access there is by road, and as you know there is no extensive road system in the Keewatin, and therefore access through the Chesterfield Inlet has to be by water, and we are as we've said 250 miles away, which is a very long distance to transport supplies and materials which would be required if the mine proceeds. So the first part of our study, which as we've said is still in progress, is the transportation of these materials, and there are substantial amounts of materials both for the construction and for the operation phase. Approximately 25,000 tons of materials would have to

be brought in every year to supply the mine with the operating supplies required to operate the plant and to carry out the mining.

Those materials have to come substantially by sea as this is the only appropriate means of carrying such a large quantity of materials. We have done a great variety of studies as to the best means of doing this. This study is just about finished, and we have now come to the conclusion that the best and most environmentally desirable method of transporting these materials is by a barge system all the way in to the dockside here, which is about six miles east of the hamlet. There are going to be somewhat larger barges than the ones that come into Baker Lake and the other communities at the moment, and the ocean going barges which come from the south directly with these materials. The other alternative, and the one that would probably be used for transporting fuels, would be to have larger boats, seagoing boats, which would come up into the inlet to a point approximately here, near Bowen Island, where there is still deep water, and at that point the materials and the oil required for the operation, would be transferred to a barge which would then travel between that point and the dockside at Baker Lake.

The dockside has been, as I mentioned yesterday, chosen provisionally. Last summer our engineers came up, looked at a variety of potential sites in and around Baker Lake which, from an engineering point of view, would be suitable, and at that time we consulted with the Hamlet Council and the HTA on these sites, as to which was preferable of the several that we looked at. It seemed that the dockside which we have shown here, six miles approximately to the east of here, would be the most appropriate and the most desirable and likely to cause the least disruption, and at the same time be close enough to be of benefit to the hamlet itself. From the dockside, the plan would be to carry materials on a winter road from the site across the lake and approximately in a direct line towards Kiggavik. As I said yesterday, we have done surveys of that route, and these include archaeological examinations to see whether there are any artifacts that could be disturbed by such a road. We have looked at a number of routes, and it is our intention to discuss these routes before a final decision is made with the people here in Baker Lake. The system, as I'm sure you understand, involves bringing in materials during that limited period in the summertime when there is open water.

I believe there was one suggestion made at a previous meeting that our intention was to have icebreakers

travel through the inlet and indeed through Baker Lake in order to maintain this project during the freeze-up period. I can assure you that this was a misunderstanding of our plans; that we never contemplated this. I don't believe for one moment it would be practical, but in any case there was never any intention to do anything but to ship in during the normal open season when barges come in here anyway.

The material would then be stored at this dockside, or marine terminal, and all the material that would be required for the operation at the plant would have to be brought in during that period of time. It would then have to remain there, stored for several months, until freeze-up and the winter open season would be started probably about the beginning of the year.

You'll probably see that there is another line going to the left of Kiggavik and up to the limestone deposit that I referred to briefly yesterday. There is a large area of limestone in that location, and as the process requires the use of lime, this would be a good place to use additional resources locally, rather than having to bring them in over large distances. This site would again be connected with the Kiggavik project by a winter road. The quarrying operation, of the limestone, would be done during the winter time when the materials would be transported over that road to the Kiggavik site.

I think that covers the general location/transportation aspects of the infrastructure. Perhaps I could answer any questions there may be in relation to this before going on to more site specific infrastructure.

QUESTION: Where would the ocean going barges be coming from, and what percentage of materials that are going to be used at Kiggavik would be coming from the south?

MR. STUART: The ocean going barges are likely to come out of the east coast ports, probably Montreal, where most of the materials happen to be obtained for supplying the essential requirements of the mine. In general terms, the major item that makes up this 25,000 approximate tons is fuel oil and I'm sure you know that this was one of the major items that any community up here has to import. Half of that is just fuel oil, and that is used for all the operations - the equipment in the the pit will all be operated by diesel power and a large part of the fuel will be used in operating the power plant, providing electricity for most of the equipment in the treatment process, and for various other uses. Half

approximately of that is oil and that all comes from the south at any rate, and the farther south you go, closer to the refinery, the better, (few words unclear) on getting it in.

The other major item would be sulphur, which certainly has to come from the south. Unfortunately, we don't have any deposits of that up here. I wish we had. If we had some, it would reduce the cost of the operation substantially. It is required for the manufacture of sulphuric acid and we would need somewhere in the region of 5,000 tons of that material each year. The other major quantity of material is made up of a variety of chemicals required in the plant, of steel grinding balls for the process of breaking the rock down into small particles, which is required in the treatment process, and that is the bulk of it. Unfortunately, nearly all that material is only obtainable in the south. However, as I've said before, one thing that we are going to use, which comes from the north and is a resource of the north, is the limestone contained in that deposit. We will need something like 19,000 tons of that material per annum. That is the big part of the material that has to be brought to the site.

QUESTION: (Inuktitut)

MR. STUART: Thank you for the question. I think there may have been some misunderstanding about flying materials in when we had ur meeting in Rankin Inlet. We certainly will be flying in certain fresh produce, and essential materials, and we will be flying people in and out of the operation. We will also be flying out most, if not all, of the concentrates which are produced. The intention always has been, and I'm sorry if this was misunderstood, the intention has always been that the bulk of the material would come in by sea. Because we're talking about a huge volume, a huge quantity in terms of flying, it would not be practical to fly that material in, except, as I've said, in very limited amounts like fresh food and emergency items that were required in a hurry. The bulk of the material, particularly these bulk supplies of fuel and other chemicals such as sulphur, would have to come in by boat. What I said was that the barges, if we use barges, and this is not entirely certain at the moment because it depends upon the shipping companies and the type of transport that they can provide. Some of the shipping companies have said they could provide ocean going barges which would be bigger than the ones of NTCL, and would come in all the way from the southern part of the inlet, through the narrows. They would still be small enough that they would pass through the

narrows, which is as you all know, the restriction on getting larger boats into Baker Lake, and then they would come all the way up to the dockside here. As I described, there would be a terminal there for unloading the boats, the barges, and for storing the material to later be transported by the winter road.

I also said that an alternative that would be used almost certainly in the case of fuel oil, is that a larger boat - this would be a seagoing boat, maybe 10,000 pounds, which would come up the inlet to a point down here, and there is a location there which is suitable for a harbour but not a dock. At one time, and in the studies we did two years ago, we considered the possibility of putting a dock there, and we did some studies on those sites this last summer. Now one of the things we found out, when we started to examine that possibility, was that the area has considerable archeological interest. It is also an important area for wildlife; and there are caribou crossing in this area close to the east end of Baker Lake. It was obviously an area of considerable concern to people both here in Baker Lake and in Chesterfield Inlet. We found that a docksite there could be very undesirable from an environmental point of view, and that it could interfere with, or harm, the wildlife in that area. Having examined alternative possibilities, we therefore decided to eliminate concept for a deep water dock.

The intention would have been that you would build a dock somewhere in this area very close to the outlet of Baker Lake, and we would then transport the materials by a much longer winter road right across the lake to Kiggavik without having a dockside here, and that a much longer winter road through areas of potential environmental concern we thought was unacceptable, and this is why we have decided upon the dockside at Baker Lake. That's one of the reasons. Another reason is that the dockside here would be much easier to operate. It's much less isolated, much closer to Baker Lake, and is likely to be a much greater benefit to the people who live here. Does that answer your question?

QUESTION: Mick, from your presentation I understand that this road from the Kiggavik site to the limestone deposit will operate as a winter road, be opened in January and probably operate throughout March or so, perhaps? The question I have is that this area, this limestone deposit, is well inside the caribou calving area and you mentioned that there would be 19,000 tons of limestone needed every year, so my question is what activities will occur on this site during the spring and summer seasons? Will you stop hauling limestone

shipments, and during those especially sensitive times between the middle of May and mid-July, will there be activities going on at that spot? Thanks.

MR. STUART: Yes, we do understand that that is a most sensitive area. The actual Kiggavik site is not in either the calving or the post calving areas, which is one reason why we seldom see caribou in that area, and the limestone deposit is more sensitive. Certainly that is - the intention is that the entire activity at that site and at the road, the winter road, which would be connecting it to Kiggavik, would be only in the wintertime. 19,000 tons is a considerable quantity of material, but it is not large by mining standards. We're going to be mining 350,000 tons of ore if the project goes ahead at Kiggavik, plus a lot more waste material to get at that ore. This is, from a mining point of view, a small quantity. It's quite a big amount of material to transport, but the whole concept of the winter road and winter operation, means that the equipment would go out there, it would break the limestone, would load it, and it would be transported to the site and stockpiled there just like the other materials. There would be no activity whatever during the summertime, and indeed the activity would be confined to probably three months right in the middle (word unclear).

QUESTION: Mr. Stuart, if I understand this right, you're going to have a docksite here where you unload your oil and other materials. You say (few words inaudible) is that an alternative?

MR. STUART: Yes it can be.

QUESTION: Okay, so you might have transfer of oil from a larger ship to smaller barges here, or you'll just have barges going all the way in here. My question is, do you plan to have oil spill containment and clean-up materials at both places, depending on which plan you use?

MR. STUART: Yes, my answer to that is certainly we do. We plan to maintain at both sites appropriate material and personnel for clean-up of any potential spill. We all know that these things can happen, and it is essential that we have proper procedures for containing it and for cleaning it up as soon as anything happens, if anything does happen. However, the procedure is well established, and in fact some of the shipping companies carry out this type of trans-shipment as a regular system. They actually bring barges with them on the boat, on the bigger boats, and they transfer from the boat to the barge in a well controlled system. They would themselves

have to maintain very high standards in doing this, but at the same time UG would monitor and provide backup insurance, that if there was any spill, it would be cleaned up immediately. This incidentally would apply to the whole trans-shipment process. We indicated there are lots of materials that would be carried through this transport system. Barges have been coming up the estuary for 20 years to my knowledge, maybe longer, and small ocean going boats have been in as far as Baker Lake, so there is a good history of transportation through this inlet. I believe the report is a good one. I believe there have been very few spills, and certainly we would be maintaining the highest standards to ensure that any possibility of a spillage would be kept to a minimum and that contingency plans were in place to deal with any spills which do occur. (end of tape side #13)

QUESTION: (Inuktitut)

CHAIRMAN: Thank you.

MR. STUART: Can I answer that question first? I think there was a question there. Okay. I would just like to respond to that statement, and I fully agree with everything that was said, and that we intend to do just that. We've already done quite a bit of consultation. I mentioned the dockside. We intend to go on doing that in considerably more detail as the plans become available. We can't discuss plans unless we have some idea of how they are before bringing them to the people here.

QUESTION: (Inuktitut)

CHAIRMAN: Thank you Mr. Curley. I think you might be talking to the wrong persons. Is Floyd in? Floyd, can you bring some comments on this situation? Mr. Adlem is in charge of our land use group in Yellowknife. He's the expert on caribou protection measures at this meeting.

MR. ADLEM: (few words inaudible) I only heard the last part of the translation.

CHAIRMAN: Mr. Curley, Floyd says he just heard the last half of the translation. Can you repeat your question, which was essentially?

MR. CURLEY: The federal government has been proposing to amend caribou protection areas in two locations. One, a huge area south of Baker Lake near Eskimo Point. The other one is a smaller region all the way from the Gary Lake area down through the Shelf Lake area. The government proposed to amend the two areas, one was on the west side of the northern area, and they sent

in a letter to us, the Hunters and Trappers group, saying that they would like to have meetings. I wasn't prepared to say, to approve changes for recommendations without any reasons. There were no reasons enclosed in the paper. They said they wanted to discuss them, but I'm like Mick, I don't approve anything unless I know the reason why. I wasn't prepared to approve recommendations from the Wildlife Federation unless specific reasons were explained to us in detail. I seem to be getting the idea the reason they want to amend the west side of the caribou protection area in the northern area is because of the limestone project. Could be a connection to that?

MR. ADLEM: Thanks Tagak. Perhaps just a little background. The caribou protection measures were put in place some ten years ago, and every year we have a monitor who is a biologist hired by Renewable Resources, Government of the Northwest Territories, who monitors the interaction between caribou and industry, and they complete a report for the Department of Indian Affairs and Northern Development which we review with the communities to see if there is any need to change what we presently call the caribou protection areas.The meetings that Tagak was referring to were to be held this week in Baker Lake, Chesterfield Inlet, Rankin Inlet, Whale Cove and Eskimo Point, and when we found out what the attendance was going to be at this meeting, we felt that we should delay them, and we are delaying them until near the middle of April. I'm not aware of any recommendations for changes. Certainly our department has not made any. The Government of the Northwest Territories to this point have not made any, and we have not as yet completed our consultation with the communities. At this moment there is no intent to change the caribou protection measures that I am aware of. Does that answer your question, Tagak?

MR. CURLEY: Yes. I'll say this then. You know I really don't, cannot understand why the government, they don't - you know, they say the don't understand it because they are actually incorporated on their map - drawn, sketched, and recommended it for amendment. That's three times, with the industry, Chamber of Mines and government involved. So, we don't understand it. There's something very wrong somewhere.

MR. ADLEM: Well, there must be something wrong Tagak, because I'm the guy that draws the map and I never drew a map this year, so I haven't had any recommendations for changes and I'm not sure what map you've seen. All I can say is that this year, right now, there have been no recommendations given to me to change the caribou

protection areas. Whoever told you there was a map is wrong.

MR. CURLEY: Well, I got them in my office.

MR. ADLEM: I don't know where they came from. They certainly weren't drawn by me.

CHAIRMAN: Okay, since it's noon, maybe we can adjourn now to come back at one thirty.

ADJOURNMENT.

CHAIRMAN: Good afternoon ladies and gentlemen, welcome back. I think at this point when we untangle ourselves we shall proceed with the description of uranium mining operations and especially the Kiggavik project. As I said, representatives of both the mining company and KRC would like to make statements and discuss their views on a number of aspects from four, or 3:30 until 5:00 or so. I think the way things are going we'll probably need an evening session to complete our review of the uranium mining operations. So at this point I'd like to turn it back to Mr. Stuart to continue describing the Kiggavik project.

MR. STUART: Thank you Pierre. Good afternoon, ladies and gentlemen. We're carrying on essentially where we left off, and we're still in a general sense talking about infrastructure in that we're looking now at a proposed site layout which, again, is in an incomplete form. There will probably be changes to this before we're finished, but it is designed to give you an idea of what will be contained within the project site.

What we're looking at, as I said, is now at a fairly large scale, as compared to the last map that we were looking at, which was over a much larger area. I think you may be able to see these grid lines here. The distance between the grid lines is five kilometres, which is about three miles. That's the scale of what we're looking at, and all of the site facilities are contained within that area. We said earlier that there are two ore bodies that we call the main zone and the centre zone, and these are shown here. This shape is the approximate shape of the open pit, which is not unlike in shape the one you saw this morning at Rabbit Lake. We have a second one, as I said earlier on, about 2,000 feet away from the other one, and this we call the centre zone. It's a smaller one, as you can see, and it is a more circular pit. That is where the actual mining will take place.

Up here, this rectangular area here, is the site of the proposed mill, the plant site where the processing of the ore takes place. These heavy dark lines represent roadways between the various parts of the project. Following down this roadway here, you'll see, is the site of a proposed airstrip which would be long enough for landing a jet plane. Going along the other heavy line, or roadway, which is along the top of a ridge, you come to one of the few large lakes in the general area, which we call Skinny Lake, which is up in the far right corner. The other lakes in the area are mostly small; Pointer Lake, Jaeger Lake, cover quite a large area, but they are not big lakes in the sense that they are quite shallow. You can see that these other little areas here are much smaller lakes. As I mentioned, this road runs along the top of a ridge and these are contour lines which indicate the elevation of the ground and you'll see that they come closer together up here and that is a way of indicating that that is a rising ridge.

Over here we have the area where waste rock will go, which has to be removed from the pit in order to mine the ore, and that is the general area in which it

will be done. Up here we have an area which is called a low grade stock pile, and that is for dumping the material which is uneconomic but which is above the limits acceptable for pure waste, and which will require special care. The only other feature on here that I want to point out is up on the top here, and is rather hard to see, but that is the site for the proposed campsite. Not shown on here is a small road which would connect it up to the road system.

This map, as I've said, is not final and there are still likely to be changes - there will be changes, but this gives a general idea of what is involved in the infrastructure at the mine, and the general layout, which as I've said, covers an area of perhaps four miles by four miles at the very outside. Now one thing that we have not shown on here is the location of the tailings area, but we will deal with this in a later stage of the presentation. In point of fact, part of the tailings will be disposed of in the centre zone pit here after the mining of that zone is complete, and part of it will be disposed of in a surface dump which will be associated with the waste dump. I will come to that later in a section that we're dealing with separately. That this is the infrastructure of the mine, then or of the minesite, or the potential minesite I should say, which we have designed this far. If there are any questions on that I will answer them, and then I will talk in a little more detail about the actual mining part itself.

Okay, if there are no questions on that, I would like to show you - okay.

QUESTION: (Inuktitut)

CHAIRMAN: I think that there are essentially two reasons why we're here. One reason is that questions are from two groups here. The government regulators, which for myself and a lot of experts you've heard earlier, are here because we've been asked by TIA and TFN to come and tell you about uranium mining and the environmental and health aspects and how we regulate those. That's the main reason why we're here. There will be FEARO hearings later on where a panel of people will come and listen to your opinion on uranium mining and your concerns about it. Right now we're just trying to inform you of what we know about uranium mining so that you have a better idea of what the Kiggavik project is all about, and uranium mining in general is all about. I think I'll let Mr. Stuart answer why he is here, other than the fact that we asked him to come to describe the Kiggavik project.

MR. STUART: Well as Pierre Laporte said, we are here at the invitation of the organizing group and to present information about the project, and though we had nothing to do with the organization of the agenda, we are certainly pleased to have the opportunity to tell the local people, particularly the people of Baker Lake, more about what we're doing. As to the question of our going ahead regardless of the feelings of local people, particularly native people, I would like to say something about that later on this afternoon, but I think I said it yesterday, and I'll say it again now, and I'm going to say it again later. We do not intend to go ahead with a project for which there is not support in this community and in the communities of the Keewatin, particularly this community.

We are aware that some people oppose this. On the other hand, I'm sure there are others who support it. I think there are also a lot of people who would like to know a lot more about it before they make up their minds, and it's certainly our intention, and this is what we hope to have done to some degree today, and to which we are committed to doing a lot more in the future, and that is telling people about our plans, talking about what is involved, what the effects would be, good and bad, and giving people the opportunity to make a decision based on good information. I don't think at the moment that this information has been adequately conveyed to people. We are at fault undoubtedly, but we intend to correct that situation with information sessions which I will talk about later.

QUESTION: (Inuktitut)

MR. STUART: Thank you. That's a very good question because that is something which I omitted to point out in my presentation. This lake I don't believe has an Inuktitut name and we have given it the name of Skinny Lake which relates to its shape. You can't see it very well up here but it is a long thin lake. It is about the only lake with a large quantity of water in it, as I mentioned. What I did not mention was that we require water for the operation of the plant, and this road is following a pipeline which would go to a pumphouse here for carrying water for the plant site. That is the one lake within a reasonable distance which could supply that water without any significant drawdown of the lake level. That lake is used simply for providing fresh water for the operation of the plant. Sorry, I omitted to mention that. If there are no other questions I would like to go on to the mines part.

QUESTION: From my understanding the reason there is some concern over which lake you guys are dealing with is because people used to live up there and there are apparently some graves in some of these parts, and I think that's what people are trying to ask some questions about, which lake you guys are dealing with. You know, there are some graves around that area.

MR. STUART: It's a good point, which was going to be referred to later on during the environmental studies, but I'll just put that back for a moment, seeing that point has been raised. We have had an archaeological study done of all the sites where we consider we would make some installations, like for example the pump site, around the minesite, where we're going to put the airstrip and also where we would take the water from. We've examined this to see if there are any archaeological remains, any grave sites. I understand there are some in the general area. We did not uncover any. What we did uncover were some artifacts which are in this area over here. We did not find any graves. Certainly that area would be investigated further, probably this year if we do any further work on that site for a water resource.

QUESTION: (Inuktitut)

MR. STUART: As I mentioned, we have a survey of all the sites that we have chosen as potential areas for development, like the airstrip or the pumping area, the plant area. We have not yet completely finalized the location of all these things, and when we have - and this will take place in the next few weeks, or months at least - and when we have chosen what we think are the best places, we will be going back this coming summer to take a closer look at each one of those. I think it's fair to say that we have not uncovered anything in the area that was mentioned, but we will be taking a closer look. Mr. Lush may be able to tell you a little more about that. He'll be talking about this survey that was done by the archaeologist along with the other environmental work over the last two years. Sissons Lake, incidentally, is quite a lot further south. My map does not go far enough. Sissons Lake is down here, quite a bit. I'd like to pass on to the mine because we have quite a lot to get through this afternoon.

Unfortunately we can't give you photographs of our open pit which hasn't yet been dug, so all we can do is make diagrams. You did see, yesterday and this morning, what the open pit at Rabbit Lake looks like, and this is a diagram of the same thing. You could imagine, you're looking at this - this is what we call a plan layout (end of tape side #14).

.... if you can imagine that. It looks somewhat like the pit that you saw this morning on the photographs. These grid lines are about 200 metres, or 600 feet apart, so the dimensions of this are about 2,000 feet - 1,800, to 2,000 feet by about 600 feet. The depth of it, at the deepest part, is around 200 metres or about 600 feet. What you see here is what we call the ultimate pit, the final pit after all the material has been taken out of it. This is the pit that we call the main pit.

I'd like to show you a section here, and this is - instead of looking at it from the top, you're standing, as it were, to the side and chopping a section, chopping into the face of that ore zone, that pit that we saw before, except that the pit is not there; the original ore is there. That's the way - if you could cut a slice into the earth right now, this is what it would look like in the main zone. I just wanted to give you some indication of what the ore looks like in the deposit as we've determined by drilling holes through and taking samples of the material from the drill holes. The surface is up here, and this is the lower, as you go deeper into the earth, this is the elevation. This would go down to about this 200 metres or 600 feet that we spoke about just now, the ultimate depth of the pit. Here you see in this hatched area two (word unclear) which are part of the ore zone in what we call the main zone. You can see that they come to the surface - this is the surface right up here. They come from here, that narrow area on the top with dots in it is the overburden, the soil material lying on top of the rock, and you can see these zones come right to the surface.

This is a picture of the centre zone pit which, as you saw on the first slide, is situated to the east of the main zone. There's 2,000 feet between them. This is a smaller zone, it doesn't go as deep, and, as you can see, it is about 300 feet, sorry, about 500 feet in width and about the same in length. These two dimensions are about the same, and the depth of it is about 100 metres, which is about 300 feet. Again, this is a picture looking down into what the pit would look like after it's been mined out.

This is another picture, going back to the main zone, shown again in sections. This time we've taken a cut similar to the one where we were looking at the ore, but this is after the mining has been completed, and you will see that in order to reach the ore which is at depth, you have to dig into the earth and you have to establish a wall on either side such that the rock

will stand competently, that is, will not fall down and endanger the people working as the pit is deepened, and will not fall down and damage the equipment there. This is what an open pit would look like if you were to stand at one end and look into it from the side. That is the design of that pit which has been just about completed by our engineering consultants based upon measurements which were made during the summer of the competency of the rock, and establishing safe slope angles. These angles, the angle at which the side of the pit is set, are determined upon by the nature of the ground, the consistency of the material. This has all been examined in the course of the study and the pit slope determined from those studies.

I think that that covers the central part of the mining. I'm sure there will be some questions on that, and I'd like to (few words inaudible). If there are no questions on that--

QUESTION: (Inuktitut)

MR. STUART: Thank you for that question which I'm sure is one that concerns many people here. It's been spoken about before. The answer is that we are quite satisfied that we can mine this project, can carry out this project, mine the ore and handle the disposal of the waste material, the waste rock and the tailings, in a manner which will not adversely affect the health of the population. Not only of that, but also of the people who work there. We hope to be able to demonstrate that to you and we have further presentations to make regarding the waste disposal part of it and the environmental part of it, which we are going to give you shortly this afternoon, but also are going to examine and explain in much more detail over the next few months during the FEARO process and presentations which we intend to give. I hope that answers that question for the moment. We understand the concern. We are certainly going to address it very thoroughly.

QUESTION: (Inuktitut)

MR. STUART: Thank you. I think that's a very sensible, important question. First of all, let me just repeat the dimensions. We're talking about 2,000 feet from this end to that end. That is not the depth of the pit, that's the length of it. The depth is about 200 metres which is, say, 600 feet. Now, the ground here is all in permafrost, that is to say it's in permafrost at the surface and down to a considerable depth. We have done a lot of drilling in this part of Kiggavik, and we have determined that the permafrost goes down to at least 180 feet. This

means that during most of the year the ground is permanently frozen.There will be no water in the pit, certainly until you get down to that point where the permafrost ends. For most of the time there will be very little water in the pit. Whatever water there may be, will be pumped out as contaminated water, and it will be contaminated as long as there is uranium in the pit. This will be treated along with the material that comes, the water that comes out of the plant, out of the treatment process which we're going to describe later. So, yes, we have to make provision for moving water, even though compared to southern areas, there would be much less because most of the time the ground is frozen. We will provide for pumping that material to a treatment area in order to ensure that the contaminant is removed from it. Are there any other questions?

QUESTION: I think I recognize you both, that's Pierre Laporte I believe, and Mick Stuart there. How are you? I think you recognize me. I'm a little bit scared because you know I think I'm the only one in Baker Lake who will support this Kiggavik project. I don't know. First of all, how many of you here are non-Inuit who support this project? I'm the only one. Hands up please. Anybody? Nobody? Nobody? Nobody? Okay. I'll tell you why. I'll tell you why I support this. You see I live there eh, all my life, and as you know there are many Inuit who don't have regular jobs, and if we put down this company, which would be in about two years from now, none of you Inuit will have any jobs all your life, nothing. Right now, this is the only chance. Did you know that? I support it. I really do, because none of you Inuit will live with government assistance all your life. Could I say this in Inuktitut if you don't mind? You don't mind eh? (Inuktitut)

I just thought that I would support this even though maybe 99 percent are against it. I don't know. I only know - maybe I'm the only one in Baker Lake who supports this. My question was in this pass through there would be a lot of heavy equipment operators I believe, is that true? Right. I really support it because I'll tell you why. If this does not go through in a few years from now you're going to amount to nothing, right now. You'll be just living on caribou meat, (few words unclear) and the rest you get from government assistance. That's not very good. You know that, right? True. I know. This is the only chance right now. Two years from now, if it gets through, we will need a lot of heavy equipment operators and whatever. If this company goes through. I think I'm the only Inuk who supports this. I don't know. But I'm a little bit scared because I'm not against it. You might get something

out of it. Who knows? You just might. I tell you the truth, and if you don't believe, find out ten years from now if my words are true or not. You just might get something, Inuit. I tell you (few words unclear) you just might get something. I guess (few words unclear) but, I support it. If it goes through, you need jobs, you have to support your wife, your kids. You need something in your life, and I believe you need that. You need it. You need something, right? You can't just live on welfare, fish, caribou and what the land gives you. You cannot go back a hundred years. Nobody. We just have to follow through the kabloona's way now. I'm not going to go back in my grandfather or whatever. I'm not going. We just have to go forward, that's it, and I think you understand what I'm saying here. I'm not going backward. I'm not going to live like other Inuits live. I may have the same colour like the Inuit are, but I'm going to be a different Inuk. All right, thank you.

CHAIRMAN: I guess there's another comment.

QUESTION: (Inuktitut)

CHAIRMAN: So I guess there are two questions to answer, with the snow and how far--

MR. STUART: Thank you for the questions. The distance I showed on the first slide here this evening, it is about 50 miles in a direct line to the west of the hamlet here. That is the distance to Kiggavik. As regards to the second one, about removing snow out of the pit, obviously snow will fall in the pit, and this snow will have to be removed from certain areas. The roadway in and out will certainly have to be cleared so that the material can be carried by the trucks as it comes out of the pit. Any of that snow that comes out which is contaminated will be also put into the contaminated storage area for treatment. The snow that does not come out will eventually melt and will of course then be handled as water which, as I've said, will also be put into a contaminated zone for treatment before release. As regards the opposition to the project, we believe still that much more has to be said in explaining what the project is, what the disadvantages are, and what the advantages are. We realize that probably more people oppose this than support it, but I believe there are also, as I said earlier, people who have not yet decided and we feel that all those people deserve more information about what's involved, and we intend to provide that.

QUESTION: (Inuktitut)

MR. STUART: During the winter time of course, as you say, the snow and any water that might be coming out of the rock would of course be frozen, and at that time you cannot pump it. In fact, it stays either as snow or as ice.You can of course, if you have to, take the snow out of the pit in order to make a roadway to come in. What we'd do with that snow, as I've said, is to put it in a segregated place where any contamination would be removed, but the rest of the snow, the ice, will remain in the pit until the summertime when some of it will melt, the snow will all melt, some ice may melt too, and it would be at that time that it would be pumped out.

QUESTION: (Inuktitut)

MR. STUART: At the site and generally in this area, the prevailing winds are from the north-northwest, probably a direction like that, and the wind is blowing from there to there. Now that is the prevailing direction, and of course as we're well aware, these directions change. I'm sure you all notice that the wind changed completely around from yesterday and we got entirely different weather out there than we had when we came in. There is no constant about the wind direction or indeed the wind speed. All we can say from the statistics and from the records, is that it blows more consistently in that direction, from the north-northwest than in any other direction. It blows fairly frequently, it blows at various velocities and most of the time there is a wind. However, at this time of year there frequently are limited calm periods. I don't know whether that answers the question. It is I think the best we can do. We have collected a lot of meteorological information which we will be including in our report.

QUESTION: (Inuktitut)

MR. STUART: Okay, there were two questions I think. One was the wind and the other had to do with the blast area. The wind situation, yes, obviously a storm coming in to the Keewatin is going to affect a large area. However, the important thing is how large an area is going to be affected by the activities of Kiggavik, and from the experience elsewhere and from the studies that we are doing, the effects are going to be extremely local in terms of emanations of dust and of radon. They will not anywhere near affect Baker Lake, which is 50 miles away, and Coral Harbour I guess is what, 350 at least, so there is, in our view, no possibility of any direct effect upon Coral Harbour or on any of the other communities. Not even in Baker Lake which is much the closest of any of them. As regards removing the rock, you are quite

right. You have to drill holes in the ground, you have to put explosives in the ground in order to break it, just like you do in a quarry. You have to break the rock into small pieces in order to be able to remove it. The distance that you can hear or see the effects of such a blast when you explode the rock depends upon the size of it. In the case of Kiggavik, I would imagine that you would not be able to detect any sound, any visible effects, for a distance greater than one or two miles, and the actual area that would be affected by dust or radon would be much smaller than that. You certainly would not be able to hear or see any sign of it even in Baker Lake, and certainly not any further than that.

QUESTION: (Inuktitut) (end tape side #15)

MR. STUART: Thank you for those comments. First of all let me say that I agree with you, I'm not an expert on environmental matters, but that does not mean to say that we cannot address those matters with the help of people who are experts, and part of our presentation today will be from the people we have who have lots of experience in environmental matters and who will be discussing and explaining to you the work that we have done. You're quite right also in saying that they haven't finished that work. I think I said it myself earlier, that we have not completed our studies, that we have more studies to do, and I'm quite sure that when the FEARO session starts there will be additional studies that are requested by them. Certainly, this is not complete as far as we are concerned and there will be more work done. There will also be more consultation with people here on the studies that we think, and that you think, should be done. Please don't think that we have decided exactly all the answers at this stage. We accept that there are many more to be answered. We will address this, as I've said, in a later session this afternoon. Are there any further questions on the mining part?

MR. CURLEY: (Inuktitut)
One of the profound things I found amazing, it really is, you know. We're dealing with a new, whole new technological attempt in the north, with the same rules that apply in southern Canada, and there is in my understanding no technology that has been introduced to deal with a uranium mine that far up north. With the rules that have been applied down south, the presentation and the government responses, appear to make it comparable to the northern conditions. I think that's a very serious problem we have, that we're assuming that the same rules with espect to environmental regulation can be applied up north, like they did in Saskatchewan and Elliott Lake

and whatnot. We have a very tremendous harsh environment. That alone, in my view, would cause the company to make a little more reference to how serious the environment is up here, how delicate it is up here, the nature itself. How delicate the environment and the wildlife is to the people that depend on it. We're treating it so lightly that the review panel will review this and we're going to be abiding by it and so on, and I was amazed this morning when Bernie said the onus is on the company to make the things work, and we're going to enforce the regulations. I think the onus has to be on everybody, the government, to make sure that we're protected wherever possible, not by experience only. That's what I'm afraid of you know, that we're a bunch of amateurs in this part of the north. Even with the winter road situation, you're going to have to pray a lot that the weather remains good, you know, with the whole lot of, you know, the train load of trucks and everything else. I think the government is going to have to shape up. I don't think it needs to wait until the environmental process gets underway. GNWT has no control over environmental matters. They can only monitor, they can make monitor meetings - you know, you see what happens and you make a report to somebody in your departmental committee. There are no regulations in force, no legislation to deal with the environment in the north. We can only say we have land use regulations, you know, and they should be good enough. They're not good enough. The land use planning process is not good enough. Water Board regulations are not good enough. They are lopsided - and I think the company's having a field day, you know, with the very lax rules in the north. I think today we've got to stop treating it lightly because we're in a very serious environment. I say the amount of budget that he's proposing is probably underestimated. I can just see the amount of snow that is going to be accumulating in that pit, in those open pit mines.

CHAIRMAN: Thank you Mr. Curley. I think the comments on regulations, I tend to object to. I don't think we are treating the environment lightly. We have regulated mines in the north. We know about mining in the north, and I think the other aspects, the uranium aspects, will be handled by conscientious people, by government regulators that are experienced with uranium, with our help concerning the other aspects of the mine operation. I think there will be a number of environmental studies that will be done so that the mine in it's planning will take into consideration most of the problems that are brought up regarding weather, regarding permafrost and things of that sort. Most likely they'll have to.

MR. STUART: I would just like to say that we are certainly conscious that there are significant differences between mining in the north and mining in the south. However, I believe that those differences are not as significant in relation to what you're mining as they are as to the actual operation of mines. There are many mines that have operated very successfully in the Northwest Territories, that are operating right now in at least as severe climatic conditions and some worse than here. These include open pit and underground mines. They're not uranium mines, but I believe the particular problems that are related to the north are very much the problems that would apply to a lead mine or a zinc mine, or to a uranium mine. Some of them are positive, some of them are negative. You have extremes of weather. This makes it difficult to operate.On the other hand, you have permafrost which has certain distinct benefits in terms of the stability of the rock that you're mining. There are pluses, there are minuses, it's somewhat different. I think that the mining industry has demonstrated very clearly that it can operate successfully under very difficult climatic conditions, and also that it can do that without damage to the environment.

There were quite a few points that Mr. Curley mentioned. I want to cover them all. Certainly the question of bombs came up again and I made it very clear every time this subject has come up, that there is no question of uranium being used by anything else but peaceful uses. That is a requirement of our company, and you've been (word unclear) Tagak, but that's the way it is, and the government has strict regulations about this. We cannot export to a country that does not have a non-proliferation treaty with Canada. That is the situation so I won't say any further on that. We are quite prepared to have strict regulations on environmental matters. We realize there are differences with the south but we think we can handle them, and we think we can demonstrate that to you.

CHAIRMAN: Can I just ask those speakers to - unfortunately we are starting to run out of time. We will be having an evening session, but if you are making comments, can you try to keep them short please? We are providing an opportunity for both the mining companies and the experts, or the resource persons brought up by KRC, to talk at 4:00 pm, and it does sort of decrease the amount of time we have to discuss things, and we still have a fair amount of interesting material to go through, including tailings disposal and water treatment, and again the monitoring and environmental aspects, reviews or the

studies at the minesite, and as well the abandonment and reclamation of the site. I would like people to keep their comments fairly brief.

QUESTION: Thank you very much. I got something here for you. Let's go back to that (word unclear) over there. I was thinking like this and I hope you understand my fellow Inuits. The (word unclear) area is right here (word unclear) by the lake. I want to tell you something like this. I know some of you, most of you are against this project or whatever the Kiggavik project, but I support it. I don't know why but I support it. I guess I'm the only one in Baker Lake who supports this. I'll tell you why. You see there are fish, caribou, you name it, and arctic hare, rabbit, and everything in there. I'm going to tell you, and this is very true. I don't know why it would be dangerous right now when grandfathers and great grandfathers, parents were living off the land for so many years. Why would it be dangerous now if they opened this project? There has been radioactivity or millions of years. Now I want to tell you, my fellow Inuits, why would it be dangerous right now? (Inuktitut) I wonder if you could show me that Saskatchewan map. Anyway, I know it's got some animals too, maybe (few words unclear) I don't know if they're dying out or not, but in here there always have been caribou, fish, you name it. I tell you right now I don't see why it will be dangerous when it's open, eh. Can't you see that? I can see it. (Inuktitut) Why are you scared, you locals? I'm not. I'm not scared. Why are you scared right now? I don't know why they're scared. I support this. I really do. Thank you.

CHAIRMAN: Thank you for your opinions. Shall we get on with the description of - how about having coffee now for the next fifteen minutes.

ADJOURNMENT.

CHAIRMAN: ... be tackling the ore processing type package, then we'll have a look at examples of tailing treatment disposal and water use treatment in Saskatchewan. So we'll just proceed on this. Mr. Stuart.

MR. STUART: Thank you, Pierre. We're now going to take a look at the process, the mill, the treatment plant - these are all names for the same thing. Just to remind you how it fits in, we've been talking so far about the mine, the two open pits which are here. The ore will be taken up this ore road and dumped at the plant and fed into the plant which is roughly in this location here. What we're now going to talk about is the process, the chemical factory as I think it was described by our friends from Saskatchewan. This is the series of processes that take place within this plant. I think it has been indicated to you that it's not exactly a simple process. There are a variety of steps that take place. It's very hard to simplify this. What I'm going to do is put up what we call a flow sheet which does not show you what a plant looks like, but just shows you what goes on there. That's what we call a flow sheet. We will try to go through this, and I will describe very briefly what happens in the various parts of the plant which are described but not illustrated in this diagram.

If you look up at the top right hand corner, this is basically where the flow starts. We call this a flow sheet because it indicates a series of operations that flow one from the other. You do the first thing, and something follows at the next stage, and the third stage comes after this and so forth. There is sometimes a split in what happens, but generally there is a flow of material through the process plant. I will describe briefly these various operations as they take place. From where the ore enters you see here the open pit, that's what we were looking at just now. The ore is trucked up that roadway that we saw just a minute ago, and it is put in stockpiles outside the crushing plant, which is an operation for breaking up the (word unclear) ore from the pit, some pieces of which would be as large as this table, some would be quite small. In order to treat it, you have to break it into small pieces, and that's what the primary crusher does. The material is put the stockpiles in order that you can blend various types of material together and feed them in as a fairly consistent material into the crusher. That's what happens in the crusher. The material, the rock in which the uranium occurs is being broken down into pieces which have been perhaps twice the size, of my fist as the maximum size and there will be all kinds of sizes smaller than that.

However, in order to carry out the process, you need to make these big pieces, into very small pieces, and this is done in a series of what we call mills which

are machines which rotate and which grind up the ore material with water. This is one of the reasons why we have water coming in, this is what happens, the first place where we have water in the process. The mills grind up this material, they convert it into very fine particles rather like sand, by rolling it with steel balls which break up the larger particles and make them into small ones. Having done that, you move the material into what we call a thickener, which is basically a machine for settling out some of the material from the mixture of water and ground material in order to take the - separate the liquid part to a large extent from the solid part.

The ore at this time is now in small pieces, and it passes into what we call the leaching circuit in which we add chemicals to dissolve the uranium out of the very small particles in which it is contained. Here you see H<2>SO<4>, that is the formula for sulphuric acid, and at this point we add sulphuric acid along with another chemical which assists in the leaching process. The principal constituent there is the sulphuric acid and we add approximately 35 kilograms, that is about 70 to 75 pounds, of sulphuric acid for each ton of ore that goes through. At that stage, the uranium is contained in the liquid, basically in a solution of water, and the solid material, the ground up ore, has now been converted into a waste product which does not contain the uranium. The uranium is now in the solution. In order to continue the extraction process we have to remove the solid part which does not now contain any uranium, or any significant amount. To do that we have more of these thickeners which are basically again designed to separate the liquid from the solid. When you pass it through these thickeners, there are a series of them, it progressively removes the solids from the liquids. The solid part, which now contains no uranium, is passed into the neutralization sector which I will come to a little later.

The liquid part goes out of a different part of the thickener and goes into what we call the solvent extraction process. The uranium is contained, as I've said, in solution. The solution is water. In order to purify it and to concentrate it, it is necessary to go through some process which will do those two things. This is done in what we call a solvent extraction plant. This is a place where the uranium contained in the water is mixed with an organic solvent which takes the uranium out of the water and concentrates it in the organic solvent. You then end up with what we call a rafinate, which is liquid, the water from which the uranium has been extracted, and that comes out one part of the extractor and again goes into neutralization. That

is another feed from which the uranium has been extracted.

The solvent that now contains the uranium goes over to the precipitation sector. We now have the material in a form which is a solution, but in order to obtain the final concentration which is required to produce the yellow cake, or the ultimate product of the plant, we have to precipitate it out of solution and we add these two chemicals (word unclear) oxide and this other one, hydrogen peroxide, H<2>0<2>, which precipitates the solid material out of the yellow cake and it is then passed through a brine process and a dried product is produced, and it's put into drums, and that is the final product of the plant. I'm sorry there is no simple way of describing this, but these are all the various steps that take place in producing the final product, and that is if you like, the object of the whole process. The whole point of the mining process is to produce that final product.

That cycle process is very similar to the processes that are used in Saskatchewan and other parts, in any other uranium mines. This is a fairly standard type of process.

There is also what we call here a bound scrip(?) from this precipitation process. Each one of these processes has a waste product, a part that has no uranium left in it. They all end up in what we call a neutralization section of the plant. In this part here, we add chemicals in order to neutralize the process and to precipitate out the dangerous parts of the product from the water that will ultimately be discharged to the environment. In this section of the plant here we have lime - and this is what we need the limestone for - because there is still a lot of acid left in the process after the leaching, the process that is done here. This has to be neutralized in order to ensure that it's appropriate for disposal to the environment. You've already heard yesterday that it's very important that any discharge water should not be acidic. This is one of the reasons why we use so much lime.

We also add another substance called barium chloride which precipitates the radionuclides. This material then goes to the tailings disposal area which we will discuss later, and from this disposal area there is a certain discharge of clear water. The solids settle out in the tailings area, and on top of that we have clear water, or nearly clear water, but it is not good enough for discharge, and this is the area where this contaminated water we spoke about in various other situations earlier this afternoon goes from the

pit. There would also be contaminated water from where the stockpile areas are. All this material would eventually go into the neutralization containment area, and the overflow water from this goes to a further treatment plant where more barium chloride is added. Because the lime has in fact been added in excess to ensure that all the acid from this process has been destroyed, we have to adjust the acidic content to be neutral. That removes the remaining part of any pollutants from the process, and to ensure that this in fact has been done before it's discharged to the environment, this liquid is passed into monitoring ponds which are designed to hold a day, or several days', discharge, so that the content of any polluting substances can be measured and analyzed before the pond is discharged to the environment. That is what would be done on a continuous basis to make sure that the standards that are required are met before it is discharged to the environment.

And that's a complicated process, I'm afraid, and I'm sure there are questions. I'd like to simplify it, but I understand that it's not easy to understand all the aspects of it, and I'd be happy to answer questions.

QUESTION: (Inuktitut)

MR. STUART: The last question I would need to refer to the experts who have a lot of experience on this. I fully sympathize with you in regard to this process. I have put it up because that is what happens (end of tape side #16).

... from there to the minesite was never contemplated because of the great distance involved. As I mentioned, you will recall at the beginning, it's about 250 miles from Chesterfield Inlet to the Kiggavik site. This is a very long distance and this is why we proposed the route using sea transport as far as possible, in fact using barges at least up to Baker Lake. This means that the winter road, instead of being 250 miles, is only about 50. The roads that were built, or would be built, in the immediate vicinity of the mine just represent a few miles of road. We are talking, as I said earlier, within perhaps a radius of four or five miles. All of the infrastructure of the mine would be included in that area. So we're talking about a very small expanse of roads that would be built around the project area. I'm not sure that I've answered all - I think those were the main points.

CHAIRMAN: Carmel, could you please answer the question of the eyesight.

MS. LETOURNEAU: Yes, that's a very interesting question. The Atomic Energy Control Board does have limits to the eyes. It's the lens of the eye that is affected by radiation, but this type of radiation would be only at very high levels.You would encounter that in over exposure in nuclear power plants or during medical examination. What happens to the lens is it becomes opaque and you couldn't see out of the eye. We do control this, so we don't encounter that particular effect in uranium mining.

CHAIRMAN: Another question.

QUESTION: (Inuktitut)

MR. STUART: Thank you for that question. It's a very sensible and a very important question, because as was pointed out this morning, even with the best management, accidents can still happen, and we have to make provisions for not only managing to the utmost, but taking care of a situation where a pipe freezes or breaks which cannot always be determined ahead of time. The pipeline of main concern is of course the one carrying the tailings, and we'll be talking about tailings a little later, but this line is shown down here, and this comes from the plant site down to the disposal area, and every plant that I know of that is built these days is built with some sort of a contingency plan such that if a pipeline breaks, the material being carried in that line will not just run away in an uncontrolled fashion. There are various methods of controlling this. You can enclose the entire pipeline in a kind of a box that retains the pipe and would retain anything that ran out of the pipe. You can also place it in a ditch or adjacent to a ditch in which any material which accidentally ran out would run into that ditch and would be discharged or retained, either in the tailings area or in some catchment area from which it could be reclaimed. There would be no possibility of this material running out and flowing down through the drainage channels and affecting people outside of the area. Do you have any other questions?

QUESTION: (Inuktitut)

MR. STUART: I have to say that I'm sorry, but it appears as though what I said in Rankin Inlet and what I'm saying today are perhaps being misunderstood. What I said in Rankin Inlet is that the winter road which would be required to carry all these 25,000 tons of material each day, pardon me, each year, into the south could not be started at Chesterfield Inlet and taken all the way to Kiggavik. It's a distance of 250 miles. I said, I'm sure, that that was never

contemplated and it never has been. However, the material still has to be brought into the Kiggavik property, and I think I said there that the winter road would be built not from Chesterfield Inlet but from Baker Lake, a distance of 50 miles, and that's what I explained today. If there has been some misunderstanding then I apologize, but certainly that is the situation. I'm not saying two things. I'm saying simply that a road from Chesterfield is too far away and would have too many environmental problems, and that a road from Baker Lake is much closer and would have far less in the way of environmental difficulties. We're talking about winter roads here. The roads that you see on site here are very short, very short permanent roads. They are only just a few miles long, and these are required to be there all year because the project is going to operate all year. Now we did not talk about these roads in Rankin Inlet because we didn't get into that much detail. This has nothing to do with this large volume of material that has to be brought from far away into the site. We're talking about two separate road systems. This part was not described because it does not relate to the main transport of materials into the site. I hope that's clear. Am I being understood now? Does what I say make sense? Okay?

QUESTION: Yes, it does, and I hope you're not going to say something else tomorrow again pertaining to that because you have already told us three different things so I'm hoping that it's not going to be a different story tomorrow.

MR. STUART: I can assure you it won't be. We're talking about three different things here. They are different, and that's why I think the confusion is taking place.

CHAIRMAN: We seem to be having problems with some of the headphones, the ones on that side. Those people who would like to have things translated, could they move over here. There are some headphones here that they can get the answers better. Since most of the answers being presented are in English, it might be more comfortable if you moved over to this side and used some of the plug-in boxes. I think what's happening is that we're talking too much, and the batteries are going dead. I think at this point maybe we could go on - oops, we have a question at the back.

QUESTION: (Inuktitut)

MR. STUART: We certainly are planning to provide a lot more information, not only on this process, but also on the environmental work that's been done, and

certainly as much of this as possible we will be translating into Inuktitut, and also we will try to simplify the information to make it easier to understand.

QUESTION: (Inuktitut)

MR. STUART: This is quite true, we have been here for twelve years, but most of that time - in fact we've been here fourteen years. During nearly all that time we have been doing exploration work to try and find these deposits that we have now discovered. The information that we're imparting to you now, however, has only been developed in the last few months, and this is why we don't have it all in Inuktitut, but we certainly are planning to correct that situation.

QUESTION: (Inuktitut)

CHAIRMAN: Okay, I don't think we're getting very far with this discussion. Maybe what we can do at this point is go on to the next stage of the agenda, which is a discussion of the tailings treatment and the water treatment. We'll start it off with a description of examples of the structures and the tailings ponds that were developed in Saskatchewan. As I said earlier, those are the most recent mines, uranium mines, that have been developed, and they essentially represent the state of the art as far as uranium mining is concerned. Here to describe the various structures and operations, is Mr. Cliff Potter of the Environment Department in Saskatchewan.

MR. POTTER: Thank you, Pierre. As Pierre said, my name is Clifton Potter, I'm with Saskatchewan Environment, and I was asked along with Mr. Barsi to come here and talk a bit about mining uranium in northern Saskatchewan and how we protect the environment. A lot of discussion here has been about (word unclear) uranium mining. As far as we're concerned, our job is simply to protect the environment, and I'll show you some slides as to what goes on in northern Saskatchewan.

This is a slide of an existing tailings area at the Eldor Camaco(?) operation near Wollaston Lake. The tailings were deposited first in this tailings area in 1975. I'll tell you a bit about this structure. There's a rock ridge here, another rock ridge here, and two dams, one here and one here. The tailings, as Mr. Stuart said, come from the mill after being neutralized with lime or limestone, and sometimes other chemicals are added to precipitate, or to remove other metals, and in this case, tailings were discharged along this area, and the water left over from the tailings is taken out through here. The

tailings come in by pipeline as a slurry, and are deposited on the outskirts, the outside, and flow toward the middle (few words unclear). The company stopped putting tailings into this area in 1985. Since that time, they have been engineering and doing studies on ways to decommission and abandon these tailings. They've been investigating a number of options over the last few years and what they're doing at this time is they're taking all the water away. They intend to take all the water from the tailings, as much as they can, flatten the slopes of the dams, and basically cover the whole tailings area with rock and bury it.

This is just another shot of the same tailings area. These are the dams, a dam on this side, there's a dam in here, the rock ridges. The lake is here. The lake in the background is - that's a bay called Hidden Bay of Wollaston Lake. We'll refer to Wollaston Lake later, that's why I mention it. We also monitor - or the company has places to monitor all around this tailings area to make sure that it's contained. The important thing to remember with tailings is that there are contaminants with the tailings, and it's important to contain the tailings both in the short term and the long term, and also to have a way to remove the water and treat the water so it can go back to the environment.

Since 1985 this company has been putting tailings back into a mined out open pit, and I think you saw pictures of this pit before with Mr. Barsi's photographs. This shows some of the tailings and the pit now. What happens is that the tailings are brought down here in a pipeline. This pipeline is in a trench, so if there are any spills it still runs down and into this building. This is a filter building where water is removed from the tailings and the water is then - the thickened tailings are brought into this pit. There's still some water with the tailings here and that's removed from the bottom of the tailings to a sand filter around the edge. It goes through a tunnel that is drilled in the rock and up into this building here. Then it goes back in this pipeline, back up to the mill. The mill sits up in this area.

This just shows another picture of the pit with tailings in it and the sand filter around the edge, so the water can filter out of the tailings, through the sand and then out the tunnel and back to the mill. Another picture of the sand filter from (word unclear) the sand, the tailings. That's what it looks like now. They have put approximately 120, 130 feet of tailings from the bottom of the pit to where they are now.

Okay, I mentioned before that the water from the tailings - in a mining operation water is produced in the mine and it's used in the mill. We consider anything that is brought in contact with the ore or contaminated material becomes contaminated water. We ask, and make it a policy that contaminated water first of all be contained, secondly, recycled as much as possible, and third, treated to our effluent standards before discharge. This shows a mine near a lake - this is the mine. There's an elaborate system of dykes here to keep the clean water from going to the mine. Once it enters the mine it becomes contaminated water and has to be dealt with accordingly. There is some seepage through here, and it's minimal. Similarly, in Mr. Barsi's talk about the ore pile and the collection of run-off from there, the diversion of water - this is a diversion system - keeping clean water from this area from becoming contaminated with the mining operation. The contaminated water is pumped from here into a settling pond and pipelined to the mill. The mill is about five miles from this mine. The settling ponds are lined to contain the contaminated water. This is a very thick plastic liner. The contaminated water is then pumped through - it's actually pumped from the mine down this area, along this road which is in a ditch, again for containment of contaminated water if there is a spill, and as we said, spills can happen. It's pumped from there to the mill.

This is along the ditch that holds the pipeline so if the pipeline does have a break or a spill, the water runs back towards these ponds, so it's contained. the water is still treated in an area by the old tailings area. All contaminated water is brought to this area which is the water treatment system. The water is brought in by pipeline. First of all, it's taken to the mill and re-used as much as possible. The excess water is treated partly in the mill with chemicals to remove radium and to neutralize it, then it's brought into this pond where settling occurs, and into a building here called the effluent treatment building where chemicals are used to remove arsenic and nickel. There are two contaminants that they have problems with removing that are in the effluent and must be removed. From this building, more settling occurs here in another pond and finally from there it enters a building with sand filters which remove any other material in the water, any other solid material.

This shows the filter building under construction so you get some idea of the size of the building. There are four large (word unclear) here, there are six more inside, that are used for final treatment of the

effluent. After the filtration, the water is taken here where there is monitoring, and then discharged back to Wollaston Lake. The company monitors at that point as well as us.

CHAIRMAN: Thank you Cliff. We can either handle questions now or we can go on to what Kiggavik plans to do in containment of tailings and water. Mr. Stuart. Oh, Chris, do you have a question of Cliff?

CHRIS: This is something I've always wondered about. Could you put that last slide on please, the little building. That water that comes out of that little building, can you drink that water, and if not, why not?

MR. POTTER: The mine manager drank the water one time. I'm not sure if I would. As far as the uranium or radionucleides are concerned, it meets drinking water standards. I'm just trying to think of all of the constituents that might be in the water as they meet the standards for drinking. I can't say for sure that they do. I would think you could drink some of the water and not have any harmful effects. There might be bacteria in there that could be harmful.

QUESTION: (Inaudible)

MR. POTTER: There certainly is - there are salts in the water, sulphates. Sulphates aren't high enough to be a problem healthwise, except you'd certainly have some diarrhea problems. It's high enough for that.

CHAIRMAN: Mr. Stuart, if you'd give us a brief overview of what the plans are for Kiggavik, please. Thank you Cliff.

MR. STUART: I put this slide back on again because we have to refer to the site in order to identify the tailings disposal areas. If you recall, the plant is here, this is the tailings area, and as I mentioned earlier on, the disposal of tailings would take place first of all into this open pit area which will be excavated when the ore has been taken out of the centre zone. As we have said earlier, the tailings, or rather the centre zone pit, will be entirely in permafrost. The permafrost goes down to the region of 180 metres and the bottom of the pit is at about 100 metres, or about 300 feet. This pit, after it has been excavated, will be entirely in permafrost. This is probably the ideal place in which to put tailings, and once the material has been taken out, then you have a zone which is frozen and which is effectively the place where the material came from, and so it will be highly desirable to put it back in.

This is in fact what we would like to do with the entire tailings of the area, of the deposit.

Unfortunately, we cannot fit all of the tailings from the entire deposit into that centre zone pit after it's been mined out. We have to find another surface disposal, another disposal area, in which the tailings could be put. This has been the subject of an intense study over the last few months-of finding alternatives for disposal of tailings in the most satisfactory and safe fashion. We would like to put them all in the pit. Unfortunately, we cannot do this, and certainly not in the centre zone pit. There is a larger zone there, as you have seen, the main zone, however, unfortunately, this pit does not extract all the material that is mineralized under present economic circumstances. In other words, there is more mineralized material underneath that pit which at the present time does not look as though it could be mined. However, that is a natural resource which in the future could possibly become an addition to the ore reserves, an addition to the life of the operation. It would not be proper or appropriate to dispose of the tailings material there, because then it would be impossible to remove any mineralized material that might be economic in the future, and which (end of tape side #17).

... As I've mentioned, there are no big lakes in the immediate vicinity except this one we call Skinny Lake. There is another one off the ramp up here about the same distance, however neither of these are very deep. They are some of the few ones in the area which are of significant size. Even with the most careful processes, you could not avoid contaminating the downstream effect from that disposal process.

We have therefore decided that a disposal system would have to be built in addition to the one inside the pit. We are at the present time working on a design for this process, and we have not completed this at this time. What I'm going to do is to give you some conceptual drawings of what we propose to do. This is a diagrammatic sketch, a simple sketch if you like, which is not intended to be precisely the way the thing looks, but it in a general sense depicts what we are going to do in the first part of the process in which we are going to store the mill tailings in the open pit. This hole here, below the ground, is indicated as the disposal site for the first period in which the tailings will be put into the open pit. As we told you, to mine the ore you have to take out a considerable amount of waste material. In fact there are approximately 20 tons of waste material that have to be taken out for each ton of ore. This is a substantial amount of waste rock

material which would have to be removed and which has to be stored. In a diagrammatic sense we have just shown this here, and this is not exactly by any means the way it would look. We are designing these facilities at the moment.

During the second phase of this we would move to a facility which would be designed essentially out of the waste rock that is removed of necessity from the pit and stored in waste piles which are normally just disposal areas. However, this would be a combined disposal area in which you would build a large structure with the waste rock in such a way that it would retain within the centre of it, the mill tailings. The base of the material here, the base of the structure, is sitting on the permafrost. Remember there is permafrost material all around the mine site, and the waste rock would be built up above the base of the storage area, so the tailings would be built up above that bedrock, above that original surface. It's not bedrock, it's overburden material, but it's frozen material, and the sides will be retained by very large waste areas. In order to ensure that the contents of the tailings pond would not seep out, a liner would be put around this area. Now we've said that the material is frozen, and that is to say the ground surface, and the waste rock as it comes out, will also be frozen, and we anticipate that the permafrost will in fact relatively move up into the tailings, and this is shown here. The cross hatched area is shown as frozen tailings, and the single hatch is unfrozen. Now over a period of time, the ice formation will creep up into the tailings. The reason that we have not completed this design yet is that we are still in the process of doing thermal modelling on how this process would take place and what at what speed it will take place.

We then have a situation where essentially we have the tailings from the mill in the ground starting to freeze as a result of the permafrost. We have the tailings in this rock disposal area, this lined rock disposal area, which are also starting to freeze, and that is the situation that is taking place as the operation continues. Ultimately, of course, this whole system, as has been mentioned here by the Saskatchewan people, has to be decommissioned, and we are looking at the whole process of decommissioning this as well as building it and operating it, and ultimately the frozen part of the tailings, we believe, will cover the entire system. The design of this is very important, that is the correct design parameters. A good understanding of what would happen under future conditions is very important, and we are in the process of doing these studies at the present time. This is why we have not reached the

final design situation of the mine. That is the process of emplacement that we are proposing for the Kiggavik site, and before going any further, I'm sure this will generate some questions. Perhaps I could answer those before we go any further.

QUESTION: I have two questions. You've described this, Mick, as being phase one storage of some of the tailings, filling in the pit. My first question is, while the pit is being dug, the mill will be operating. The mill creates tailings. What will you do with those tailings? Do you want to answer that first?

MR. STUART: Yes, I should have explained that a little more fully. The intention is at the centre zone, and if you remember, this is the centre zone pit that we are talking about, in order to facilitate this process, in order to be able to use in-pit storage, which is the ideal method, we intend to pre-mine that material. The ore out of that pit will be pre-mined before we start the mill process. This material will be stockpiled and in fact will be treated only when the entire pit has been excavated.

QUESTION: Okay, thanks. Another question I have relates to the reliance - this system seems to rely very much on permafrost to work, and if what we believe in the newspapers about a warming of the climate and I don't know if there's an Inuktitut word for greenhouse effect, but some of these long-term climate changes may have an influence on the depth and the nature of the permafrost which you are relying on to some extent to contain the seepage, and the tailings. I'm wondering if you've accounted for the long-term warming effect which may be a problem a few years down the road.

MR. STUART: Certainly there has been a great deal of discussion and talk in recent times about the warming effect which could be associated with acid rain, with this greenhouse effect, with potential holes, actual holes in the ozone layer. All these things might have an effect. The nature of the effect could be, we understand, quite serious in terms of raising the ocean levels and the prospect that there could be considerable flooding of low-lying areas over a period of time. However, what I believe is the effect, and of course we are talking about things which are not very well known, but I understand - and I'm not an expert in this field - but I understand that the anticipated effect, shall we say, on an inland area like this would be essentially some slight increase of what we call the active layer, which is the part of the surface which in a permafrost condition does in fact melt during the summertime. Any surface area in the permafrost will

melt to a very shallow extent during the brief summer period which we experience, and in this part of the world, it's in the order of about one metre that melts during the short summer period. As I said, I'm not an expert, and these long range predictions of greenhouse effects, but I believe it's the understanding of people who are more knowledgeable than us in this, that the effects on, as I say, an inland area like this would be to somewhat deepen that active layer, but not to a great extent.

CHAIRMAN: We have, among our resources people Dr. Allan Judge who is head of permafrost research with the Geological Survey of Canada. I was just wondering, Dr. Judge, if you'd care to comment on the proposed storage of tailings and possibly the long range effects of the greenhouse effect.

DR. JUDGE: I'll start with the least known first. In terms of the greenhouse effect, I think we all have to accept that we don't know very well what might happen. One of the things we do know is that the impact in the north is going to be more serious than on other parts of the globe. There have been efforts to develop computer models, directable models, based on what seems to be a reasonable assumption on how atmospheric chemistry might change. Those estimates assume that the CO<2>, the carbon dioxide or equivalent gases in the atmosphere, may double by the year 2050. The global models predict that as a result of those changes in the chemistry of the atmosphere, that temperatures in northern Canada would probably rise on a yearly basis by three to five degrees celsius. This is pretty vast. If, however, you look more carefully at those predictions, the largest rise would occur in winter temperatures. The rise in summer temperatures would be somewhat less. The rise in winter temperatures would be accompanied by increased snow. The snow acts as an insulating blanket, so the overall change in ground temperature, which is what controls the permafrost, would be less than the change in air temperature.

Everybody recognizes that at the moment we don't know a great deal about these problems. There's a world-wide program called the International Geosphere- Biosphere Program currently being put together, and if the weather doesn't prevent my departure tomorrow, on Saturday I will be at a meeting of the Royal Society of Canada, where we are trying to develop a program of setting up stations throughout Canada, particularly in the north. In the north, the idea is that some of the parameters studied will be the atmosphere, ground, the way the ground changes with time, the wildlife, and how these

all interact together. This is probably the first time in human history that we finally recognize in a structured, organized way that much of what we do is interconnected. Anyway, that's enough about the program. Now let's think about what the effect might be at Kiggavik by the year 2050. Of course what's of major concern is the long term stability of those tailings.

One of the problems we immediately confront is that there really isn't enough information at the moment on the permafrost itself. There's not enough information on its temperature, there's not enough information on how these temperatures change seasonally, there's not enough information about development of the active layer, how the thickness of that active layer varies from place to place depending on the amount of overburden that's present on the soil. We observed in the Contwoyto Lake area, which has similar air temperature conditions to here, active layer development in exposed bedrock of as much as three and a half metres, rather than one metre. We don't know enough about the ground ice and what kind of ground ice is present, whether it's ground ice associated with the active layer, associated with ice where it is, etc.

Now if we take the limited temperature information that does exist, and take the information that exists from the global modelling of the future, then it would not be reasonable to expect that all of the permafrost would melt and start flowing away. However, it would be reasonable to assume that the increase in thickness of the active layer might be one and a half to two times what it is at present, and this is the basis that we're working with in the design of the runway expansion at Rankin Inlet. That's sort of a best guess. There's a mixture of things that I've talked about. They include the present, but I don't think we know enough about the permafrost, which makes it very difficult to assess some of these concepts. The second point is to try to know or understand how the tailings might behave over a very long term. I think a lot of what Mick is telling us is that a mine that is in a locality such as this, indeed there are other mines in the Northwest Territories that have operated successfully with some (word unclear) problems, there are uranium mines that seem to have worked successfully in Saskatchewan which are not in continuous permafrost. If we can combine these two concepts, I think we need to study the designs very carefully. We need to investigate the sites very carefully, and I would recommend that we have some very sophisticated monitoring programs that combine research with the normal kind of surveillance and monitoring. Do you

understand that? In other words, monitoring would go beyond the kinds of things that are measured as part of normal regulatory processes. I think it's crucial that if the project goes ahead, that local people, northern people, be involved in that environmental research, and I think we can all learn to gradually do things better in our own backyards. This was not a very quick answer I'm afraid.

CHAIRMAN: Thank you Dr. Judge. Last question before we call it quits for supper.

QUESTION: Dr. Judge, the projections that you gave for the year 2050, your best guess that could be made on the data that exists now, best projection, and that's only 60 years from now, is there any way of predicting what the situation might be for example 260 years from now?

DR. JUDGE: As far as - did we manage to translate greenhouse effect okay? As far as the greenhouse effect is concerned, the (word unclear) greenhouse effect, future predictions very much depend on you and I and the political process. If we move to burning fewer hydrocarbons, destroying fewer of our forests, and we do it relatively rapidly, it may be reasonable to assume that the climate would stabilize (word unclear) times CO<2> at the predictions that I mentioned. If we don't get our act together internationally, I don't think any of us are too sure what might happen.That's one side of it. The other side of it is that permafrost has in the past both grown and decayed in response to natural cycles of climate. If you go back 8,000 years, the landscape here was covered by ice. Subsequent to that Baker Lake was covered by water.

QUESTION: What are we doing now?

DR. JUDGE: What do you mean, what are we doing now?

QUESTION: What's the point?

DR. JUDGE: The point is that over very long time periods the climate, and thus in response, the permafrost, will change quite rapidly. However, those large changes in its thickness happen very slowly with time periods of thousands and thousands of years. That's the point.

QUESTION: I know that Mick is probably going to argue that the best way to reduce the greenhouse effect is to build lots of nuclear power plants. I guess my question is that should things continue to warm up, say over the next couple of hundred years - I guess it strikes me as sort of a big above ground frozen swimming pool,

that's sort of the idea. Should something happen to that, say in 250 years, who would be responsible for that? If there was any damage to the environment or people's health. Who is going to be around in 250 years with the responsibility to clean the mess up. There's a problem of monitoring. Sometimes in my opinion you find out that something has happened and you can't do a whole lot about it by the time you've figured out what's happened. I guess that's my worry.

CHAIRMAN: I don't know if Mick can answer that question, but there is an answer to that question. I presume that the people who allow the mine to go ahead, if the Government of Canada or the Government of the Northwest Territories do allow the mine to go ahead, would ultimately be responsible in 250 years. Whoever happens to be operating, who runs the country at that point would have to react to it. I guess that's it for now. We should come back at 7:00 and continue on with our discussions.

ADJOURNMENT

THURSDAY EVENING 7:00 P.M., OUR LAST SESSION

CHAIRMAN: I think we have three basic topics left to discuss. One is the transport and use of concentrates. A second one is monitoring and the environmental impact of mines. We'll use again a Saskatchewan example because they do presently have a monitoring system that is keeping track of what's happening in the mines, and finally we'll discuss the land use and reclamation and decommissioning of uranium minesites. I think the first topic, transport and use of concentrates, I will just asked Mr. Stuart to come up and essentially answer any questions you might have on the topic. I don't think there's all that much to discuss and we all have heard Mr. Stuart tell us this afternoon what he plans to do with uranium, but if you have any other questions...

QUESTION: Yes I have got a couple of questions about the tailings area. I'm talking about the long term stability of the tailings area. I have two questions in that area. The first is what is the size of the tailings, of the surface tailings area, and the second is do you have a basic short term stability and behaviour of that tailings area as it sits on the permafrost. I guess there's a third question just to finish off. A while ago in the various discussions and what not I understood that Urangesellschaft was going to mine in the summer, but just maybe to clarify a point. Are you going to mine all year round or just in the summer?

MR. STUART: Okay, to answer the last one first, it's the shortest one. We are going to mine most of the year round. We will probably close down the mining operation as such during two months, I would think the two most severe months of the year, probably the months we're in right now, for the reason that the weather is the worst at that time. There are fairly continuous temperatures of the order of -35 C or less below, and from experience elsewhere, it usually involves significant lost time because of whiteouts where you just have to stop everything, but more particularly, there are the effects on the mobile equipment used for the mining. Because of the low temperatures, you have extremely high maintenance costs. Therefore, it pays to mine a little bit more during the other months of the year, stockpile this material, and actually cease mining operations for probably a two month period. That's probably out sonario at the moment.

The first question you had was the area of the tailings, is that correct? As I pointed out to you,

this design is still in the formative stage, but to give you a general idea, we're talking about a tailings area of the order of 150,000 square metres, I think it's about 50 hectares - something of that order. That is the actual area of the tailings. The waste rock, which will be surrounding that, will be a much larger area. There will be a large waste rock berm surrounding that area which means that the whole structure will be very large. (end of tape side #18)

CHAIRMAN: Are there any other questions that Mr. Stuart hasn't answered yet?

QUESTION: Where will the uranium ore go after it reaches Winnipeg?

MR. STUART: You mean the concentrates? I don't think there is any intention of (word unclear) going to Winnipeg. What we have said is we anticipate flying them out to a site in the south, which may be the refinery operated by (?) Chemical these days, which is the Canadian refinery here in Canada, or it may possibly go to refineries abroad. Basically, that would be where they were going. They would then be used in nuclear power plants in various parts of the world. We have said that these concentrates will be used only for peaceful purposes, but they will essentially be used in nuclear power plants and we will over the course of the next few years, if this project proceeds, be negotiating contracts with nuclear utilities in Europe, in the Far East, and probably the United States. Those will be the ultimate destinations of those concentrates. Any further questions?

QUESTION: (Inuktitut)

MR. STUART: Okay. The answer to the first question is one I would very much like to have myself. The study we are doing at the present time is designed to establish this. I've already said that the concentrates would be sold essentially abroad. The reason for that is that the nuclear industry we have here, which is quite considerable in Canada, already has contracts with existing mines. We would very much like to sell it here in Canada, but the contracts are already in existence and we will not have the opportunity to sell them here. We will be selling them to foreign utilities as we've said, and only to those within those countries that have signed non-proliferation treaties with the Government of Canada. That is, I'm afraid, about the best I can do for you. We'll have a better idea when we've completed the study we're doing right now. The feasibility study is designed not only to carry out

the necessary engineering studies to determine whether it's feasible from an engineering point of view, not only to carry out the environmental studies to find out what can be done in environmental safety, but also to determine the economics of the project. That will decide, all of those factors will be taken into account in the feasibility study, which is in the process of being carried out.

CHAIRMAN: I guess maybe we can move on to monitoring, and have Cliff Potter describe what they do in Saskatchewan and then go from there.

MR. POTTER: Thank you Pierre. I'll talk to you just a bit about how the mining industry is monitored, and how that helps us to ensure the environment around the mine is protected. One of the first concepts that I want to talk about is the use of water quality objectives. Saskatchewan has objectives for the protection of fish and other aquatic life. These are standards that are set for various constituents above which fish may be endangered, so we've got to protect the aquatic life by making sure that things don't get into the water that exceed these objectives and therefore harm the fish. In the north, the primary thing that we try to protect is aquatic life. We also in the south of course, protect other uses like irrigation, drinking water, raw water supplies, that sort of thing. In the north, its mostly fish and aquatic life.

With respect to the mining operations, we do this by issuing, negotiating with the companies, operating approvals, and these approvals have a few pages of - I've got a copy of one here - but they have many pages of conditions including effluent limits and including monitoring environments. I have a couple of overheads here to describe the monitoring at Eldor. This first slide is only for an illustration. There's too many points on it, but if you can understand this, you're doing very well. Anyhow, this the big lake out here, and this is the shoreline; the mining operation's in here, with another mining operation here, and tailings here. All of these points that you can see with numbers are places that are monitored. I just wanted to show you the number of monitoring sites there are. This is for one mining operation. For the one mining operation, in the mining approval there are conditions requiring the company to monitor water at these various locations, ie. domestic water supply effluents. We try to stick to one point of control, one final point of control, one effluent. We monitor that at different points within the treatment system, as often as daily, weekly to annual, the receiving water - that's where the fish are or the lakes or the

streams, at 11 locations, and groundwater at various points around the operation.

Now as well as actual water, we have requirements for monitoring the sediments of the lake, because we know that sediments tend to, as Dr. Brunskill was saying, tend to concentrate contaminants, where a lot of radionucleides and atoms end up. On the airborne side, there are particulate samplers. We ask for stack sampling. In case of an acid plant or sulphuric dioxide stack sampling. Radon monitoring occurs at a number of sites. The operations are all monitoring lichens, and soil. For fish we were interested in two things, both the spawning habitat of the fish, and concentration of metals and radionucleides in the fish flesh and in the bone. Fish are collected and sampled, analyzed for these materials. That just gives you an idea of the type of monitoring.

Before an operation starts, we ask companies to collect information just as Urangesellschaft is doing now, on these various environmental media, to get a baseline. You know, what's the situation now, so that we're able to use the ongoing monitoring to see if there are any effects in the environment. I mentioned in the operating approval, that we set limits on what the company can discharge in their liquid effluent. These are the limits that we use for the Eldor operation. There are 14 constituents here, arsenic, copper, lead, nickel, radium, thorium ect. for example, we set a radium limit of .37 becquerels per litre. That's actually about one third of the drinking water limit. As well as (word unclear) monthly inspections and site visits, we have inspections at least monthly; quite often more than that, on an average 16 days three times a year we come on site. We do our own monitoring. We do enough monitoring to ensure that the data the company generates is valid and accurate.

I've got a couple of slides here that show the concentration of radium in the effluents. This is at one of the uranium mining operations. With respect to (word unclear), this is the minimum. They started out in a bad situation at Cluff Lake. This is because during start-up they had some problems with the treatment system, and they had in their effluent, fairly high levels, but as soon as they got the problems ironed out they had no problem since then. Another operation, uranium mine in northern Saskatchewan, everything has been less than (word unclear). This is the Eldor mine, the operation that we've seen most of the slides about over the last two days.

As I was saying, this limit here is less than the drinking water limit. The drinking water limit is somewhere up here, but we have stayed below this for most of the time, except during the winter of '82 I believe it was, where they had some freeze-up problems, and a problem there. Eldor mine installed filters, sand filters, in '84, and since then the level has been almost down to a point where we had trouble detecting it. It shows how effective sand filters can be in this type of treatment. One other thing we did at the Eldor operation was to have an independent consultant review all of our data, and he wrote, a report for us in '85, and the one conclusion that we'd like to point out is that the uranium operation at Rabbit Lake has had no significant effect on the aquatic quality, fish, or other users of the water at Hidden Bay on Wollaston Lake. We were able to get a consultant in here to help us evaluate the data that have been generated in the first ten years of operation. That's it.

CHAIRMAN: Do we have any questions at this point? I'd like to point out that in the Northwest Territories, water licences are issued for mining operations which include these effluent maximum limits as well as the monitoring program which describe the location and the frequency of sampling.

MR. POTTER: I'd also like to say that we work closely with AECB on these things, and we work together to develop licences and negotiate licences with the operators (few words unclear) completely apart.

CHAIRMAN: Yes Mr. O'Brien.

MR. O'BRIEN: I believe Bernie Zgola said earlier that after the big spill at Key Lake there was a requirement to put in electronic devices to monitor threatened spills.

NEW SPEAKER: Ron Barsi.

MR. O'BRIEN: Okay, whoever. The requirement was to install these devices, monitoring gauges, after the big spill. My question is, will such monitoring devices be installed right away, from the beginning, at Kiggavik, at such places as around tailings dams, and tailings ponds, along/beside the lines carrying tailings to the tailings pond, along the lines that carry the water back from the tailings line, from the tailings ponds to the mill, so that if there are any breaks in the tailings pond dam, if there are any breaks in the tailings line, or the contaminated water lines, that there will be immediate alarms going off? I have another question on the monitoring as well. Could someone answer that?

MR. STUART: The precise nature of the instrumentation put in as a result of the Key Lake spill I'm not fully aware of, but ertainly to the extent that monitoring can be used for detecting pills, or potential spills, along the lines of what was put in ey Lake, will certainly be incorporated in our plant. There are methods which will be different, types of methods for detecting breaks in tailings lines, but the difference with that is that we already have a system set up to cope with a spill if it does occur. But in general, the design of the Kiggavik project includes all the sophisticated monitoring devices that have been found to be effective (word unclear). I can't be more specific than that at the moment.

MR. O'BRIEN: My second question, earlier on, before dinner, Dr. Judge said that he would advise very strongly, after the tailings pond is built, the place where the tailings will be stored, that it be monitored very closely after it is built to make sure that it's working properly and it's not going to fail. It seems to me that that's really saying that what Kiggavik is suggesting for their big tailings pond, that suggests to me that it is in fact a big experiment and that to my way of thinking, it's better to do the experiment beforehand, to find out if that sort of approach to making a tailings pond can be made to work. Before you build a tailings pond try out the idea first. If the idea works, then make your tailings pond that way, but don't make your tailings pond a big experiment, because if the experiment doesn't work, then it seems to me you're in trouble.

MR. STUART: I think Dr. Judge made several suggestions, one of them you referred to, namely, monitoring very closely what happens after the proposed tailings dam is filled. This I think is a very wise precaution but it's certainly not the whole story as you pointed out. There is a lot more work that has to be done and we, as I've said, have been developing this concept for months and there is quite a lot of work that we plan to do on this to endeavour to establish that the system we're proposing will work in the way that we've said, and that certainly has to come before, not after, the event. I would agree with you on that.

CHAIRMAN: Okay, I've been told to make sure that people talk into the mike, and I'll try to do that. You also have a question. Dr. Judge.

DR. JUDGE: I certainly was not thinking in terms of a total experimental approach. What I was thinking of much more closely, is very careful security so that one really does perhaps have an extra measure of

observation than one might have if something was totally conventional. I think this is a very wise sort of approach to take. I'm not really thinking that this is an experiment for the very first time.

CHAIRMAN: Thank you Dr. Judge. As we go on I'd to have Dr. Dennis Lawson come up and describe briefly what the Environmental Protection Service, which is part of the Government of Canada, has been doing in northern Saskatchewan. He mentioned the metal mining effluent limits that they have been enforcing.

DR. LAWSON: Thank you. I'm a mining environmental engineer with Environment Canada in Regina, Saskatchewan. I've been involved in regulating the development of uranium mines in Saskatchewan since 1982 when the Beaverlodge operations were closed, and I'd just like to explain to you about our numbers that govern the amount of radioactivity that leaves the minesite in the effluents. Environment Canada is responsible for the pollution control provisions in the Fisheries Act. Under that Act we have passed regulations that govern the heavy metals and one of the radioactive elements in the liquid releases from uranium mines.

These regulations were proclaimed in 1977 and we reported in 1982 on the extent to which the mines were meeting those regulations, and by and large those regulations were being met. There were some minor exceedances as indicated by Cliff Potter.Now in 1984 we were asked to review those regulations, given that we were only regulating one radioactive element in the effluent, and that was radium 226. The question which was raised was should we not also be regulating the amount of uranium in the effluent, and the amount of other radioactive substances such as uranium, lithium and thorium 232. We set out to provide answers to those questions. We convened a small scientific workshop in which we brought together the three most eminent Canadian researchers on radioactivity in fish. We asked them what they knew about how fish accumulated radioactivity and at what levels of radioactivity there could be damage to a fish. We assembled the data that then existed on the levels of the various radioactive elements in the waters to determine if indeed fish would be damaged by the current levels of radiation in the waters that were leaving Canadian uranium mines.

These three scientists told us that there was little scientific evidence to support there being any damage to fish from the levels of radioactivity that existed in the water that was currently leaving Canadian uranium mines. We then asked ourselves, could there be any damage to man from these effluents. We convened a small group of five or six of our own

people plus experts from the Atomic Energy Control Board, and we took the data for the Canadian uranium mines on the radioactive content of the water and we used that data to calculate the amount of radioactivity that would reach humans if they were located very close to those sources of discharge. We calculated the dose of radiation that they would receive from each of the radioactive elements, uranium, radium 226, thorium, lead 210, and we calculated that for their consumption of water, consumption of the fish inhabiting that water, their consumption of moose meat from those locations where the moose were using that water, and their consumption of wild rice that could be growing in that water. The final answer that came out of that study was that the doses, those calculated doses, were ten times lower than the Atomic Energy Control Board standards for the protection of the public. The conclusion reached by Environment Canada was that our control on radioactivity by controlling the radium 226 in the water was sufficient to protect the fish and mankind. At the moment, we don't contemplate any changes to those regulations.

I would like to point out that those calculations were made based on the waters that are leaving the minesites after passing through the treatment plants at the minesites. Now the waters that enter those treatment plants have a hundred times more radium 226 when they enter the plant than when they leave the plant, so that we do in fact need to continue the treatment of those waters, and we need to closely monitor those waters to see that the treatment is effective. Our last report on this was published in 1986 and the Canadian uranium mines at that time were meeting our limits.

CHAIRMAN: Thank you Dr. Lawson. Are there any questions of Dr. Lawson at this point?

QUESTION: (Inuktitut) (end tape side #19)

CHAIRMAN: Mr. Stuart.

MR. STUART: I will try to answer at least two of those questions. The third one, which I gather related to some deaths which occurred in Saskatchewan, I have no knowledge of, and perhaps some of the gentlemen from that area may be able to answer that question. I certainly cannot. As far as the question of who will compensate the native people if the caribou die as a result of our activities, I say again what I've said before, and I will be saying again and again I'm sure, that we do not intend to go ahead with this project unless we are satisfied, and you are satisfied, that we can do this without endangering

the caribou. We are very well aware of how important it is to the native people of this area who rely upon the wildlife that exists here, and in particular the caribou. We believe that we can extract this uranium without endangering the caribou and we are going to conduct our operations to achieve that, or as I've said before, we will not commence operations. There still seems to be considerable concern about the snow accumulation, that this may eventually end up in Baker Lake. Again I'm quite satisfied that we can contain this within a very small area and ensure that no contamination goes outside that area. The next section I believe involves a description of our environmental program and plans, and Dr. Lush will be going into some detail to explain to you how we plan to carry out this project in an environmentally acceptable fashion, that is the process that we are going through in order to achieve that.

DR. LAWSON: Mr. Stuart indicated to you that his company intended to capture the meltwaters flowing into the mine and treat them. They would be required to treat them to the federal effluent standards that I just talked about previously. That being the case, we have no scientific reasons to believe that there would be damage to the fish. As an example, there was a uranium mine in Saskatchewan at Uranium City that operated from 1952 to 1988. Basically the effluents were uncontrolled because our regulations did not come into effect until 1977. We had calculations made of the radiation doses to the fish in that lake and those doses were 150 times lower than any radiation dose that scientists tell us would even begin to start affecting the fish.

CHAIRMAN: Mr. Curley.

MR. CURLEY: Thank you. Mr. Chairman, I'm quite pleased to hear some of the successful research on the fish that you have conducted, but my curiosity is really this. You know, you work for the Federal Government which is responsible for federal regulations with respect to uranium, thorium and nuclear industry related chemical substances. I know these regulations have been debated by a number of other eminent doctors right across the country and I'm wondering whether there is available to us publicly in writing, you know, (information from) these three individuals who were satisfied with the research and effect on the fish and so on. Because I know that there are questions today. The public would like to have a broader involvement with the questioning and reviewing of the regulations; that is a fact today. They would like to have a public inquiry of some type that would also have ordinary people like us and other individuals and other eminent specialists and

people right across the country to really deal with the regulations, rather than controlling them in some laboratory somewhere in a corner of Environment Canada's office somewhere, coming to terms with the acceptable level, so-called. We are concerned about that because people up here consume a whole lot more wildlife and fish from the land, rather than supermarkets anywhere. They have no choice really. For that reason, would that discussion or report be made available to us so that we can compare it and make a proper statement on it?

DR. LAWSON: All of the work that I described is in an Environment Canada publication that's available to you. The proceedings of the workshop are in the back of that publication and the names of the scientists that we consulted are there with the material that they provided to us, and all of the assumptions in the calculations which we made are there as well. Now when your environmental impact assessment comes to be done as part of the FEARO process, you can have those same calculations performed as part of that assessment and have them performed specific to the conditions associated with the Kiggavik project, and you can find out what the doses are from all of those radionucleides and all of those pathways and see for yourself how the Kiggavik situation differs from the situation in northern Saskatchewan and the situation in Ontario. That type of work can all be repeated within the context of Kiggavik.

CHAIRMAN: Thank you Dr. Lawson. Any other questions?

QUESTION: (Inuktitut)

DR. LAWSON: Well, I simply don't know the answer to that question. Someone in the audience apparently does, but what I would like to say is that when we meet with Mr. Barsi and Mr. Potter and Mr. Zgola, and when we design our environmental monitoring programs for the mines, the selection of the species of fish that we choose to monitor is debated at length and we do try to choose fish that feed on the bottoms of the lakes, and we do try to choose fish that inhabit the marshy areas of the lakes, and we do try to monitor fish that are sports fish, fish that are taken for recreational pursuits. We do try to monitor those fish in a number of different locations, and it is important to monitor those fish close by where the effluents are entering the waters, so our programs for monitoring the radionucleides in fish are thought out by several levels of government and we try to reach agreement on which fish to monitor, what parts of the fish to monitor. We monitor the flesh and the bone of the fish. The monitoring of the fish is quite extensive.

CHAIRMAN: Thank you Dr. Lawson. I think we have another question over here.

QUESTION: (Inuktitut)

CHAIRMAN: Dr. Brunskill would like to answer the comment.

DR. BRUNSKILL: I am from Saqvaqjuac. I have done work there on fish. I have studied fish that feed on the bottom and I have studied fish that feed on other fish. As far as I know those are the same kinds, of fish that live in the area of Kiggavik. According to the people that have set nets there, they have caught the same kinds of fish. They are char, lake trout mostly, and many of the smaller fish such as grayling. These fish we have analyzed at Saqvaqjuac for uranium and its daughters, uranium and all of the children of uranium, and we have separately studied the radionuclides in the stomach contents and compared them to the fish flesh and to one and skin. So, we do know a little bit about this. We are not ignorant of how uranium and its daughters go into fish tissues, and we have also studied the organisms, the small bugs and plants that fish eat. We find that under natural conditions where there is no pollution, the fish will eat bottom organisms and lake organisms that live in the water and they will concentrate these radionuclides to varying extents. I talked to you yesterday about this.

CHAIRMAN: I was just wondering - Mr. Hicks has another comment, but I think Mr. Stuart would like to answer the leaking tailings.

MR. STUART: Yes, I would like to say that I fully understand your concerns, the worries that you have in relation to the wildlife and the importance that has to you. We believe, as I've said before, that we can contain effectively dangerous levels of radiation, of other potential pollutants. Again, you've talked about the snow problem. I think that when we have reached a more advanced stage in the design of this tailings impoundment, we will be able to explain to you better with better drawings. Certainly these were very very preliminary sketches, not real engineering drawings that we presented today. I think we will be able to satisfy some of these concerns. That is certainly our intention.

CHAIRMAN: Dr. Lawson - Oh, I did promise Mr. Hicks. Okay. Dr. Lawson.

DR. LAWSON: Environment Canada shares your concern about the release of radiation from these facilities when they are closed and decommissioned. I would like to point

out that one of the design criteria that we used when the uranium mine at Uranium City was closed, was that the release of radioactivity after the site was decommissioned was to be no greater than it was during the period of operation of the mine. One can look at the release of radiation from the operating mines and attempt to calculate the radiation doses to the people and the animals during the period of operation and use that as an indication of the maximum amounts of radiation that will be entering the environment after the facility is closed down. Now we were asked a question in the 1980s by the public and by other scientists about the release of radiation from all of the operating mines in Saskatchewan. We undertook to have a study done at that time which looked at the release of radiation from those mines into the air out to 50 miles from each of the three operating mines at that time: the Rabbit Lake mine that you've seen the pictures of, and Cluff Lake and Key Lake. The radiation doses to the people and to the fish and the animals in that study were also calculated along the rivers leaving those minesites. Near one of the mines, the Rabbit Lake mine, there's a small Indian community, Williston Post, which is 20 miles from the Rabbit Lake mine. We calculated the dose of radiation to the people in that town and we compared it with the natural radiation doses that those people were receiving. The increase in radiation being received by those people was approximated in that model as three percent of the natural radiation dose. The period of time of the calculation was I believe, for a 15 year period of operation, perhaps another 15 year period of decommissioning, and I think 30 years thereafter. I would have to confirm that, but it was over a reasonable span of time. Thus the most exposed members of the public living in that vicinity, the radiation that they were receiving due to the operation of those mines, was the natural rate plus an additional three percent, and that was from all sources of radioactivity, including the radon gas, their consumption of caribou, and their consumption of moose. Now, in that same study, estimates were made of the doses to the animals themselves - the doses to the beaver, to the caribou, to the moose, and to the fish, and all of the doses were estimated to be lower than those which would be detrimental to the animals themselves. Now when the people come here from FEARO and ask you what you would like to see done in the studies of the assessment of the Kiggavik mine, you can ask for those types of calculations to be repeated and those comparisons to be made again. You can judge for yourselves what the incremental radiation you will be receiving from that mine is in comparison to the natural rates of radiation that exist in this area.

All of that work that I have described for northern Saskatchewan is also in a published report by Environment Canada that was in the list that I handed out this morning, so copies can be made available for you to review yourselves, or you can have other people review it for you.

CHAIRMAN: Thank you Dennis. Jack, you had one comment?

MR. HICKS: Actually I have two comments. The first comment is about where Dennis mentioned the people would be able to compare the calculated doses they would be getting compared to the naturally existing background radiation. Given the fact that we know the Keewatin was just soaked with fallout from aboveground nuclear testing in the 1960s, it's pretty hard to say what is the naturally occurring background radiation. Clearly they can compare it to what they've been getting and what they would be getting, what people would be getting in their food in the future compared to what they have been getting for the last 20 years, but I'm not sure that in the Keewatin you can talk any more about the natural background radiation.

The second point I want to make is about independent scientists, and this isn't meant as a slight against the good doctor from Saqvaqjuac. Can I have that slide I asked for? I noticed something interesting a minute ago. At the time this slide was put up on the screen we were told that, and we have no background to dispute what is in this slide. It says that the Rabbit Lake uranium mine had no significant effects on things in Wollaston Lake. Maybe it's true. The interesting point is that we were told that this statement was made by an independent scientist. Notice the name, Lush. The same person is sitting right next to Mick Stuart and his job now is to be in charge of most of the scientific work that will help Mick Stuart prove that this mine is going to be safe. It's interesting that it's the same person, and I think that says something about science and the nuclear industry that someone one minute can be an independent scientist working on contract for the government and how he's sitting in the same room doing environmental consulting for the uranium company. I just wanted to make that point. We also had a promise that at 8:30 the consultants that we brought up would be able to make some comments on their own agenda, so perhaps after more questions we could do that.

COMMENT: (few words unclear) having a field day.

CHAIRMAN: We are are we? I felt rather uncomfortable before. Mr. Lush, would you care to comment?

MR. LUSH: I don't know whether I really should comment on that. I make no apologies for the work that I do. I do it objectively. I do it with the best scientific methods that are available, and that's the conclusion I came to. I make no apologies for it whatsoever.

CHAIRMAN: Mr. Curley.

MR. CURLEY: I'm not really sure whether there's any point in going through all these exercises because I don't think UG has to worry about anything. The regulations are in place and the experiment seems to be - there has never been any such problem - so what are we worried about? As far as I'm concerned the only thing to worry about is whether people are going to support the project or not. That seems to be the present problem.(Inuktitut)

I just want some indication here. Who lives in this part of the land? The only people that we really haven't asked, you know, do they have any sort of conditions that they would like to see (few words unclear). I'm not one hundred percent sure the only route to go through with this exercise is a review panel. For you that's the only route. There are a number of agencies here - Indian Affairs have set up conditions that you know, obviously their regulations are important to them. Inland Waters regulations will be abided by. So far there has never been any problem with them, for any companies to meet these requirements. Land use regulations I think are just a rubber stamp, regulations that the industry will obviously have no problem meeting. EMR, we're not sure yet what kind of regulations they're going to put through. Lorne Matthews here, I'm sure you can just, you know, maybe copy some of the ones that are being used in northern Saskatchewan, so that's not a problem. Atomic Energy Control Board, you have never had any problem with the industry so your conditions are not going to be any problem to you, Mick. Surely we have heard a lot from the Government of Saskatchewan. Your experience doesn't seem to pose any problem for UG, so I don't know what good that is doing to the people up here. Obviously we're going to be hearing, going through an exercise to document socio-economic concern to the region. We got at least one applicant today, you know, who said that economic benefits are going to be important to him, so surely you can meet that requirement. The FEARO panel will consider a number of things, you know, whether fish can live in sort of, what do you call it, polluted water. You have done all that work already. So far you haven't seen any problems, Mr. Brunskill, so you really got no problem. The only other thing that I want to tell to the public, is the Inuit people have lived up here. Obviously they have

used that land, surrounding areas, the negotiations are going very well with the land claims and the federal government. There are many conditions with a number of agreements. I'm surprised this guy who works for them has not invited these groups, these (word unclear) parameters of the land to make a case, unlimited access to the chair to make their case to the people of Baker Lake. I'm a hundred percent amazed. I can't believe it. They felt comfortable doing this really. So you're going to abide by a number of conditions. So far you have not refused to meet any requirements or conditions that so far have been experienced right across the country. I want to ask you this question. Since there are successful negotiations and the amount of lands have already been settled, in this region, 37,000 some odd square miles have been agreed to by both parties, each community is being allotted 5,700 some odd square miles of land. Now will UG also comply with Inuit land claims and if not, why not. (end tape side #20)

MR. STUART: You have told me that land claims have reached a certain stage which I was not aware of. I am certainly aware that negotiations are underway and these negotiations are not public, but we know they are going on. We do know that there is a process of devolution not only from the federal government to the territorial government, but from the territorial government to the individual, in this area, Inuit owners, and that these would be the basis of land claims settlements. I believe an agreement in principle is well underway and that this may come about within the next few months. We, as owners of this project, and I think I can speak on behalf of CPGB, who is a part owner in the project, we are committed to, as I've said several times here before, going ahead with this project only if it is acceptable to the people of this region, and the people of this region are to a very large extent Inuit people. We are presently dealing with the federal government because they are the proper people to deal with from a regulatory point of view. They own the mineral rights. We understand that as a result of these land claim settlements in the future, that these rights may change, they may be transferred to Inuit people, and we are certainly quite conscious of this and quite prepared to say that we will accept the new owners if they should be the owners of the area on which we will be operating. We are quite conscious of the fact that this area is traditionally Inuit land, that you Inuit people have lived here for centuries, long before the white man was ever in this part of the world. You have a right to expect that your life, your livelihood, which traditionally has involved the wildlife and the use of that wildlife to maintain your living, that you have a right to expect that that will continue to be respected, and we are dedicated as project owners, to do just that. I would also say that this symposium here or this meeting here, which we did not design, we came by invitation just as your organizations came by invitation and we had no part in organizing it. We attended because we were invited and I hope that our attendance has at least improved the lines of communication. Certainly, it has told us very clearly that there is opposition to this project here in the Northwest Territories, in these various communities. We are conscious of that, but we've also discovered as a result, particularly of this session here in the last two days, that there is a rather imperfect understanding of uranium and of uranium mining. And this is not too surprising. It's quite clear to us that this is a difficult subject. One thing I want to tell you is that we have already decided that we intend to go ahead with

a program of information at the various communities, in Baker Lake and in Rankin Inlet, Chesterfield Inlet, the nearby communities, which I hope will enable people to understand better about uranium and about uranium mining. We will try to do a much better job of communicating than we have done in the past. Having said that, we intend to do this over a period of the next year by some workshops and meetings, seminars, in which I hope a more thorough and adequate understanding can be reached, of the process and of the aspects of uranium mining which are so complicated and difficult to understand. Our intention is to give you the information to make a fair judgment, and that's all we ask. If at the end of the day the judgment of the people who live in this part of the world, the people who have lived here traditionally and whose land this is, if the judgment of the people at that time is that this project is not desirable to go ahead, then it will not go ahead. I hope that answers your question, and puts the position of the joint ventures of the project in an understandable form.

CHAIRMAN: Everybody seems to be pointing the finger at this poor guy who organized the seminar. I obviously bit off more than we could do in two days. I think I promised we'd get off at 8:30. It's now 9:00. I am willing to conclude our sponsored portion of the seminar. However, there is one person I think should get a last chance to speak. That's Mr. Paul Scott with the FEARO program who could tell you what is happening as far as the FEARO hearings are concerned, and I think which is the next stage in the study of this project.

MR. HICKS: Pierre, you've breached your promise to us. You said at 8:30 our consultants could have their own agenda. FEARO can have all the chances - they can speak after us.

CHAIRMAN: Can I just let Mr. Scott speak for two minutes and then I'll close it off. Paul.

MR. SCOTT: Thank you. I will be very very brief.I just wanted to let the people in Baker Lake know that the Environmental Assessment Panel that was appointed in December by the Minister of the Environment will be starting its first round of public meetings here in Baker Lake on the 1st and 2nd of May. These will not be the main public meetings. These will be a preliminary two days of meetings that will introduce the panel to the community and allow the community a chance to express their concerns to the panel so that those concerns can be turned around to Urangesellschaft and to government agencies in the form of requirements for studies and investigations.

It will only be after those studies are completed, and reports made available to the panel and to the communities that the main public hearings will take place, and those public hearings will not take place until all of the information is in. The earliest that we anticipate that that would be possible would be late in this year. That would be the earliest. There will be a preliminary opportunity for the community to talk to the panel in this hall here on the 1st and 2nd of May, and we will have more information on those meetings for you in the very near future. Thank you.

CHAIRMAN: Thank you Mr. Scott. As I mentioned when I first opened this workshop, we were hoping to tell the people what the Government of Canada and various people that we hired, or brought in as resource experts, knew about uranium mining and hopefully inform people about what was planned for the Kiggavik program. We have done most of the agenda. As I was reminded, I am half an hour late, so before closing the government sponsored portions of this workshop, I would like to thank our interpreters, Michael and Leonie, who've done a very great job under rather tiring conditions at times, and all of the resource people that came up to assist us in providing information to the people of Baker Lake. Thank you very much.