TRANSCRIPTION OF MEETING BETWEEN DOE REPRESENTATIVE AND GOVERNMENT OFFICIALS OF THE REPUBLIC OF THE MARSHALL ISLANDS AT MAJURO

DECEMBER 8 AND 9, 1982

The purpose of the meeting was to present to and discuss with the government officials of the Republic of the Marshall Islands, two publications: "The Meaning of Radiation for Those Atolls in the Northern Part of the Marshall Islands That Were Surveyed in 1978" and "The Northern Marshall Islands Radiological Survey: Terrestrial Food Chain and Total Doses."

Those present were:

Senator Ishmael John	Enewetak
Senator Calep Rantak	Ujae
Senator Ataji Baloo	Kwajalein
Senator Donald Matthew	Utrik
Minister Jeton Anjain	Rongelap
Minister Tom Kijiner	Likiep
Senator Tokwa Tomeing	Wotje
Senator Katip Mack	Arno
Mayor Jabwe Jorju	Rongelap
Major Necheld Leem	Ailuk
Mayor Elden Juda	Utrik
Senator Report Emmius	Mejit
Mayor Aneo Keju	Mejit
Senator Mwejor Mathusala	Wotho
Oscar deBrum	RepMar
Phil Muller	RepMar
Suzanne Cowan	RepMar

DOE:

Mr. Roger Ray
Dr. William Robison
Dr. Tommy McCraw
Mr. Harry Brown
Dr. William Bair
Mrs. Alice Buck
Mr. Reynold deBrum

The following is an unedited verbatim transcription of the English language portion of a recording made of the two-day meeting. Since it was not possible to identify with certainty all of the Marshallese speakers, they are identified in most cases as "Marshallese." From their translated comments it is frequently possible to identify the atoll they represent and for many of these it might be possible to identify the speaker. The translator, Mrs. Alice Buck, is identified in the transcript as the speaker only when she spoke for herself. Conversations and discussions among the English speaking participants that were not translated into Marshallese are given in parenthesis. A few words are left blank in the transcript because they were not recognizable to us. The addition of these and the identity

of some of the Marshallese speakers would improve the transcript, if they can be supplied to us. Because it was not always clear on the tapes where sentences and phrases began and ended, much of the punctuation was inserted arbitrarily.

The transcript does not fully reflect the friendly, yet serious atmosphere in which this meeting occurred. The frequent instances of humor and laughter are recognizable on the tapes, copies of which are being made available.

W. J. Bair
February 1983

[redacted]

We have many copies of that report and wish to make it available, that booklet, (wish to make it available) to everyone who will find it interesting and useful.

[redacted]

We appreciate very much your coming in to be with us here so that we could come to one place to make this presentation. At later dates we hope to visit your home islands and at least answer questions that people may have and perhaps make a presentation if that seems worthwhile.

What we would like to suggest this afternoon is that Mrs. Buck will go through the booklet using the slides. (and) She will not read it entirely but she will summarize what is on each page, summarize each chapter of the book. (and) We will be pleased to answer questions during and after that presentation. We would suggest that the questions be questions of explanation of what she has said rather than questions of broadening outside of what is in the book. Then after you have had a chance to study it, to look it over tonight and tomorrow, we would like to suggest that tomorrow afternoon we would meet with you and entertain any questions that may have come up as a result of your reading.

Does everyone now have a copy of the (of the) colored pamphlet?

(Right there on the table in front. etc. Coming up.)

Does anyone have a question or suggestion before we proceed?

Alice Buck: We have one question here.

Ray: Yes.

Marshallese: Who was it that you had thought would be in this meeting?

Ray: We had expected to see representatives of the leadership of the atolls that were surveyed and any other members of the Nitijella, any members of the government. We were prepared to have whoever might be accommodated in whatever space would be provided. I think it was left entirely to the government to make the choice of who would be here to listen to us.

Buck: We have another question here.

Ray: Yes.

Marshallese: The title of the book as presented here on the book says this report concerns atolls in the northern part of the Marshalls. Now just which atolls are these?

Ray: They are listed, I believe, on the, well...here named on the chart on page 8 and 9. Those are all the ones that were surveyed. This report does not deal with Enewetak and Bikini. They've been separately reported in other reports.

Buck: All right another question.

Marshallese: Why did you treat Enewetak and Bikini differently from the others?

Ray: Enewetak and Bikini had been the subject of earlier surveys and there were decisions that the Enewetak people had to make in 1979, before we had this survey completed. So we prepared a booklet, a separate booklet, for Enewetak which was presented in 1979. Similarily, the people of Bikini asked us to make an earlier presentation to them when they had to make some decisions about their future. (and) So we produced a separate booklet for them. Those are mentioned in the back last few pages of... Bikini is mentioned on page 61 and Enewetak on page 59.

[redacted]

don't see them named in this map. (and) So the reason that they do not appear in this book (is this), does this mean that they have not been significantly contaminated, or what is the reason that they are not?

Ray: That is the correct answer. At the time of the, at the time these islands and atolls were selected for survey a careful study was made of what had occurred in the past and it was concluded that these were the ones

that might show some significant contamination. That if we cover these, we would (in ? found*) that there was no concern about the ones on the fringes of that pattern, that we need not be concerned outside that pattern.

Buck: Further question.

Marshallese: Has there been any survey made of other atolls than those in this book?

Ray: There have been limited surveys in other places. There has not been as comprehensive a survey as has been done, as is reported here, on I guess any other atolls but those that are listed here. There have been, (and aside to Alice, "can you find something for spot check?"), there have been brief visits, small excursions to other atolls just to be sure that there was not something that had been missed.

Ray: Many many surveys have been done starting back during the test days by the University of Washington, by Brookhaven Laboratory and by other Department of Energy Laboratories. These have all been reported in the scientific literature, they have all been reported to the Trust Territories Administration, to the Department of Interior. These three booklets represent our first attempt to try to convey this information back to you in a way that is meaningful. We, perhaps, ought to consider going back and looking at some of those other things and putting them in a meaningful form but it is a great deal of effort to summarize it. If there are specific places that people are concerned about and would like to know what information exists, that information is available and we will make it available.

Marshallese: This may be my final question. I would wonder if it would be considered appropriate, I would think it would be beneficial and I would like to request that information regarding Wotje since I am representing Wotje could be given to us. This is my request.

* There was static on the tape.

Ray: Yes certainly.

(Voice in background cannot be understood.)

[Alice Buck - Began presentation in Marshallese of material in book.]

TAPE 1, SIDE 2

Buck: A question!

Marshallese: Since this depicts the radioactive things circling the globe and actually going everywhere that seems to imply then that all of the Marshalls have been contaminated. Is that a fact?

Ray: It's a fact that the fallout from the atomic testing of all countries does circle the globe, so to that extent we can say everywhere. Everywhere in the world especially in the northern hemisphere has received some fallout.

[Alice continued her presentation.]

Buck: Yes, a question.

Marshallese: This is labeled the least amount of radioactivity, small amount of radioactivity, and so on. Which one of those numbers or categories is permissible for people to live healthfully?

Ray: Dr. Bair.

Bill Bair: None of the levels would be considered dangerous.

Marshallese: Is there any such, can you say that there would be a category at 0 were there is no radiation?

Bair: No because it was mentioned earlier that fallout from the atomic bombs went all around the earth, so the whole world is contaminated to some amount.

Buck: Another question here.

Ray: May I follow that just a bit?

Buck: Okay.

Ray: Before there was any atomic bomb, there was radiation in our environment, worldwide. The radiation, naturally occurring radiation, in the waters of the ocean, in the fish, in the plants. It has been there forever, since the earth was formed. We are also exposed daily to radiation from the sun, the cosmic rays from the sun. So there is no place that has zero radiation. What we are portraying with these numbers is that that which is caused by the bombs is not very different in quantity or intensity from that which occurs naturally. As the number gets higher it is more, it is larger in proportion to what is there naturally. But nowhere is there no radiation.

Marshallese: So, here we see on the map of Bikini the figures 4 and with that you are saying that, that 4 is a level that is safe for habitation? May we live at Bikini?

Bair: I can't answer that question whether you can live at Bikini. Bikini Island has more radiation on it than the other places that are labeled 3, labeled 2 and labeled 1.

Marshallese: It seems like you said before that all these figures including 4 were, it is possible to inhabit those places, so now that means that we are able to eat whatever we want and drink whatever we desire at Bikini because that is labeled 4?

comprehend and a lot easier for us to address after we develop...

Marshallese: I am still not quite sure why we need to go further into the book when we are right here at this place and we can compare Ailinginae has a 2 and Bikini has these other numbers. (and) So it seems appropriate to address this question right now.

Ray: Well, certainly we can, can pursue it now. I was just suggesting that what comes after this helps to explain those numbers.

Buck: I will tell you what I am really asking. I am questioning the accuracy of the numbers. It seems like maybe Bikini then should probably be a 6 or a 7 rather than a 4. I am just wondering that.

Bair: The number 4 means the radioactive contamination is above a certain level. The level 3 is another range, level 2 is another range and the level 1 is the lowest range. So when you have an island or an atoll that says 4 it has a range of values which may (be) extend upwards. I don't know how high because I don't have all the data. Do you understand what I am saying?

Marshallese: So the 4, does the 4 represent acceptable doses? And if that is the case does that mean it is safe?

Ray: The 4 represents an area which has radiation contamination above a certain level. We have not yet talked about what that means in terms of dose or what it means in terms of living at that place. There are other things beside the simple number of what the radiation level is on a particular island. There is the diet of people, there is the location from

[redacted]

That is a measurement, that is what 4 is. That is a level of radioactive material in the soil.

Suzanne Cowan: Dr. Ray is now saying that the designation 4 has no upper limit. It is a designation above this limit. Whereas how can you say that and Dr. Bair is saying that all these designations are considered not dangerous?

Bair: If people lived on these islands that have a level of 4 on them and didn't eat any food that was grown on those islands they wouldn't get much radiation exposure. They wouldn't get much radiation. But if they eat food that is grown on those islands, they would get more radiation depending upon how much food they ate from those islands.

Ray: I think there is a misunderstanding here. Let me try and clear that up. Dr. Bair did not say that any number is not dangerous. What he said is that the numbers that were measured in this survey would not indicate a dangerous situation at any of these locations. We do have actual measurements that permit him to say that. It is not an open ended thing

all the way up to the sky. The number is a number that we know and that's what he is saying is not dangerous. For simplicity of notation here, we've said that everything above that hundred number is just a 4 because we know that it doesn't go very much higher than that.

Buck: Oscar is suggesting that we do proceed with the presentation that is to be made and, not wanting to put any damper on the questions asked, nevertheless it might be profitable to hold them until tomorrow which we have already explained will be opened to any sort of question and suggests that we go further with the explanation that is prepared in the book of these matters.

Buck: He was again saying that I would rather want to understand each page as we go along rather than we might forget what some of our questions are regarding this if we go along. Oscar tried to also explain that doubtless some of the answers to what your question is on this page will appear, the answers are given in the next pages. Rather than confusing or departing from this we are actually going into this deeper and more clearly.

[Alice Buck continued presentation in Marshallese.]

TAPE 2, SIDE 1

(Note - The beginning of Tape 2, Side 1 was accidentally recorded over. This material has been inserted in its proper sequence, at the end of Tape 2, Side 2. Part of Alice's presentation in Marshallese recorded on Side 1 was lost by this error.)

Marshallese: It was stated that there has been radioactivity in the world from the beginning. How come the people in the Marshalls were not sick in years before?

Bair: Because, because the amount of radiation naturally..., well. We don't really know whether people in the world have been made sick because of the natural radiation. There is no way of knowing whether sickness that

we see in the people in the world is due to radiation or not due to radiation. You can't answer the question. Radiation has always been here. You can't, you don't know what it would be like if we did not have radiation.

Bair: Some scientists believe that the natural radiation in the world does cause cancer and other diseases. Other scientists don't believe that this is true. It is an unsettled question.

Marshallese: I feel confused but we can go ahead.

[Alice continued presentation in Marshallese.]

Buck: A question is asked, "what are these?" "How far down do these atoms go?" "In this picture, we have a picture, he says how far does that represent?"

Bill Robison: We find the radioactive atoms distributed through the soil column down to depths as far as 60 to 120 centimeters, but more of it is at the top and it gets less and less and less as you go down. But you do see it, it really, some of the activity that's in the surface soil, slowly makes its way all the way down to the ground water, the lens water.

[Alice continued presentation in Marshallese.]

Marshallese: We are asking about the fish you mentioned now, that there is not as much in the fish as in plants or in food-bearing plants. Have you studied the bones of the fish or are you talking about the flesh of the fish?

Robison: We have studied the flesh and the bones both but most of what we talked about is the flesh because that is the part that is consumed. (and) So in the reports we have published, however, there are data on the concentration of these radionuclides in the flesh, in the bones and in other organs of the fish.

[redacted]

occurs in a thyroid the disease that appears in a thyroid as cancer, ...is the thyroid cancer a result of damaged cells?

Bair: Yes.

Marshallese: I wanted to know in the case of thyroid cancer if there are two individuals one of whom it is very probable that his cells were damaged by radiation and the other person they do not believe that that was a factor. In other words radiation-induced thyroid cancer as opposed to non-radiation-induced thyroid cancer; would the operation be different for these individuals? Would you handle the one different from the other in operating?

Bair: No. You would handle them both exactly the same and you would not know whether either one of them was caused by radiation.

Marshallese: They cannot find out by looking at the cell whether it was from radiation?

Bair: No. Cancer caused by radiation is exactly the same as cancer that occurs naturally.

Cowan: Can you through bioassay determine if there is abnormally high levels of iodine-131?

Bair: You could do that, yes.

Cowan: Well, wouldn't that be a probability?

Bair: That would increase the probability that it was caused by radiation but not assure that it was caused by radiation.

Cowan: But it would give a probability?

Bair: But it would increase the probability.

(Background conversation - Alice and other voices. Alice was trying to translate the above exchange into Marshallese.)

Bair: You won't find radioactive iodine in a cancerous thyroid because the thyroid, if cancer was caused by radiation, the thyroid would have had the iodine many years ago and now it is gone. You cannot look at a thyroid cancer and measure radio-iodine in it unless the person has received it recently. (and) If that is the case it was not caused, the tumor was not caused by radiation.

Phillip Muller: I have a question. I think I heard you clearly say that iodine is the cause of the thyroid, possibly caused by high iodine. You said that life span of iodine is relatively short. Do we have any explanation as to why some of these thyroid cases have taken long before they developed? For instance they didn't happen the same year that fallout took place but relatively sometime thereafter. Do you have an explanation?

Ray: That is the point Dr. Bair was making. Maybe you had better have your question translated first.

Ray: What we do know about the cause, about iodine-131 causing thyroid cancer is that it takes quite a long time for the cancer to appear after the radiation exposure occurs. We also know that the iodine-131 has a short enough half-life that if it caused the cancer in the thyroid, by the time the cancer shows up the iodine is no longer there. So the measurement that Suzanne is suggesting that might determine how much iodine is in the thyroid at the time the cancer is there has nothing to do with how the cancer was caused. Whether it is high or low, it has nothing to do with it because it wouldn't still be there if it had caused it.

[Alice continued presentation in Marshallese.]

Marshallese: I am asking about the last sentence of the paragraph that was just read, which is on page 26. In other words we are comparing populations now, if you compare the population of the Marshalls with the population of Yap, it's not greater in the Marshalls than in Yap?

Bair: What is not greater?

Buck: The number of birth defects that occurs in a given population.

Bair: The information that I have seen in a report that appeared in 1978, I think, did not show any difference in any of the territories in the trust territories, in any of the communities of the trust territories. You couldn't distinguish one from another in terms of birth defects, cancer, or other disease.

Buck: In micronesia your saying? Yes.

Bair: It was in the five-year health plan for the trust territories.

Marshallese: I have seen a report that indicates that there has been an increase in the number of defects since the bomb tests, and I don't see how

[redacted]

Marshallese: We feel that there has been an increase. We just see that there has been more and I just really doubt that you could really say that the Yapees have the same rate of birth defects as any other group of people or that the Marshalls have no more than other people. I really can't see how you can make a statement like that. Is it actually so?

Bair: That was the data in the report that I saw. I have not seen more recent data that would suggest otherwise.

Buck: That was in 1978?

Bair: I think it was 1978.

Buck: Why don't we make such a study so that we could have these figures and see if there has been an increase or not?

Bair: I assume that health data are being collected in the Marshall Islands and in the other territories. These data could be compared anytime.

Marshallese: Would it be good to include information like that in this booklet so that people from the outer atolls could have also had that information? That kind of report has not been included in here.

Bair: We don't have the information to put in the report like that.

Bair: And also it was not the subject of this report. This report is to deal only with the amount of radiation in the atolls of the Marshall Islands now and the possible health effects in the future.

Marshallese: We are talking about the future, whenever we speak about children being born we are thinking about the future generations, those that are going to be born. So it seems like this information is pretty pertinent and that kind of data probably should have been included in this.

Bair: Well we have addressed that in this book for the future in terms of the amount of radiation that the people will be exposed to if they live on the islands. We don't feel that the radiation levels on any of the islands in the Marshall Islands where people are living now is high enough that would cause any increase or any detectable increase in birth defects in the future.

Marshallese: I appreciate your answer but I feel that there are doctors that we can summon who would refute this and would say in the coming years there will be a great, a high increase number of children born with defects.

Bair: There are no data on any population in the world that has been exposed to radiation that shows an increase in birth defects. The survivors of the bombs, of the atomic bombs that were dropped on Japan have been studied for many years and there is no evidence of any birth defects in these people. No genetic effects have been observed. The only information that scientists have about birth defects comes from animal experiments. There are no human data that allows us to predict how many birth defects will occur as a result of parents receiving radiation.

Buck: You say that the human data has been studied and has not been determined. (They are laughing about the rats or the rodents.)

[redacted]

If there is something that someone wants to bring to us we will be glad to

watch it. We have tomorrow available and then we must leave. We may still be going through this brochure to this booklet tomorrow, I think, if we don't go on. If I might say to Phil, I'm sure that there are lots of worthwhile, worthy health studies and other sorts of studies that could be done. Our purpose here is to report on a specific study which is complete, to give you the results of that study. We admit that it is narrow in scope. It doesn't deal with anything but what we have said. The condition of the selected atolls of the northern Marshalls at a particular time in 1978 and then some conclusions having to do with residents in those atolls. If we can get through with that then I think we can branch out on any subject that you want, provided we've satisfied the questions that go with this report.

TAPE 3, SIDE 1

[Alice continued presentation in Marshallese.]

Marshallese: I would like to ask if there was a difference between the types of bombs that were detonated in Japan and those that were tested in the Marshalls?

Ray: Yes they were...The bombs that were dropped over Japan were detonated in the air quite some distance above the earth. Those that were detonated at Enewetak and Bikini ranged from some that were underwater to some that were at great altitude much higher than those in Japan. They were at the full range of altitudes.

Buck: I would like to ask, I think the purpose of his question was were they different kinds of bombs and your response was as to where they were denotated.

Ray: I'm sorry. I thought he asked where they... Yes, there were a wide variety of bombs at Bikini and Enewetak, all different kinds of designs. There were two different kinds of design in Japan. The radiation from all of them was the same as is described here.

Buck: I am asking about the strength. Is one stronger, more powerful bomb than the others?

Ray: Yes, there were much stronger, more powerful bombs than in the late years at Bikini and Enewetak than any that we had ever used before. The strength of the radiation from any given element was the same no matter what the bomb source was.

Cowan: Are you saying that those are fission fragments and daughter products from the fission bomb?

Ray: Yes, of course. Well, there are fission products resulting from every bomb that we have tested.

Cowan: But you are saying that the radiation produced was the same for fission or fusion explosions?

Ray: For any given radionuclide the radiation coming from that material is the same no matter what the source of that material is. Does that answer your question?

Cowan: Not exactly. I'm looking at the fragments and the daughter products not being the same.

Ray: The fragments of, let's say, cesium-137 coming from a bomb that was fired over Nagasaki, Hiroshima, Bikini or Enewetak, that cesium-137 is the same. As it decays, it decays into the same family of end products or daughter products, and they have the same energy, they radiate with the same intensity.

Cowan: The same products were created in Nagasaki and Hiroshima as was created at Bikini and Enewetak?

Ray: Yes.

Buck: Is there more radiation in a place that has more bombs tested than a place that has fewer bombs? I suppose it compares between Nagasaki and Bikini or whatever?

Ray: Yes, as a general statement that is correct, yes.

(Oscar deBrum - comments to the Marshallese not translated.)

Oscar deBrum: What time tomorrow do you want to meet?

Ray: We are at your disposal.

Male Person: 6:30 or 7:00 a.m.?

deBrum: Seriously is 9:00 all right or 8:00? If you can be here in time we can be here. I doubt if all of you will be here. How about 9:00 or 10:00, all right? Okay, fine, they will be ready with some questions, and I hope you will have enough time to answer any questions that we have.

Ray: We are at your disposal.

deBrum: Can you stay until Monday?

Cowan: These people here represent various islands and atolls and they have to go back and explain to their people what you have explained to them. With their memory only. And I am asking if we may have the privilege of making a copy of your tape recording since we were not prepared to record this conversation, so that the representatives would have the benefit of this fine presentation as made by Alice to assist them.

Ray: Most assuredly.

deBrum: More than that, Suzanne. I have asked if we can televise this and they have agreed to it so that we can show it on the television so that they can see and hear the questions.

Ray: I have just one question, Mr. Secretary: "Where's the camera?"

deBrum: We don't have it yet, but by tomorrow morning, I hope. Question and answer period, I hope, it will be here.

Ray: I am not sure, Suzanne, I don't know if you were here when I said we do plan to visit the outer islands.

Cowan: I think the preparation that these people need, to make those for their presentation. Maybe Dr. Bair can assist them in making copies of tapes. Do you guys have, you have capabilities?

deBrum: Very fine. ... we'll make them available. ...

Ray: If you can copy it here, fine. If not we can send you a copy back.

Bair: I think I would rather do that at home.

[Alice continued presentation in Marshallese.]

Marshallese: Boy, I am really confused now with that statement that says because scientists feel that the amount of radiation present in the Marshalls now is not large enough to cause any of this kind of damage. How come some places are off limits? It sounds to me like the amount of radiation is not significant or small.

Ray: Where is the sentence that he is referring to?

Buck: The last sentence on 27. "Because the amounts of radiation are small in the Marshalls today scientists do not believe..." How can you say that it is small today?

Bair: Maybe I should explain a little bit more of what we know about the effects of radiation. First, the only reason, the only way we know that radiation can cause harm to people is because we have been able to study populations like the Japanese and a couple of other populations in the world that have been exposed to high doses of radiation. In those populations we have seen some effects such as cancer.

Bair: We also know from experiments that have been done with animals that if you give them large amounts of radiation you can cause cancers, you can cause birth defects.

Bair: One other thing. As I said before we have no evidence that if people who live in the Marshall Islands and received radiation at the levels that are there now that they would have any health effects, either cancers, or genetic effects or birth defects. There is no evidence that the people would be harmed. However, since we don't know for sure we believe that it is better to be safe and not let people go on to those places because,--I like to equate radiation in a sense with cigarette smoking. We know that if people smoke a lot of cigarettes they will get lung cancer or many of them will get lung cancer. We don't know how many they have to actually smoke before they, we don't know how many are safe; how many cigarettes people can smoke before harm will occur. It is very much like radiation. We don't really know how much radiation people can receive before they might increase the risk so that they would have some harm such as cancer or birth defects. So we believe that people should minimize the amount of radiation that they receive. (To Alice: Is that too much?)

Marshallese: I feel my original question hasn't really been answered because though you say this, that the amount that is in the Marshalls is safe, yet an older lady that would come from an outer island and say why is it that I can't go to this particular island and the answer would be you should not because it might be harmful. So this seems to be contradictory.

Marshallese: So I am really, I am critical of this statement here that stated it is small in the Marshalls.

Bair: Is this the statement at the bottom of the page?

Buck: Yes.

Bair: That has to do with plants and animals.

Marshallese: Yes, you say it has to do with plants and animals and yet we are told not to eat the plants at certain places.

Bair: The plants may not be harmed because of the radioactive materials in the soil because plants are not very sensitive to radiation.

Marshallese: So, then we can't eat that though?

Bair: No. These same plants that will not be harmed because they are not sensitive to their radioactive materials that are taken from the soil still contain those radioactive materials and if people eat them those radioactive materials will enter their body and they might cause harm.

Marshallese: Why would it cause harm if you say it is a small amount? The small...

Bair: It may not cause harm but it may. (To Alice: What we would like to discuss is the risk, the probability of effects occurring but I don't know how to do that.)

[redacted]

Buck: I was thinking though that the book has said that you don't want to continue eating foods that have it in it.

Ray: I have got to try one more statement that might help. This statement that says the plants will only be harmed if they received an exceedingly large amount of radiation refers to what happens to the plant itself and the plant can receive an enormous amount of radiation and even to the point of being destroyed but that would not signify that if you then ate that plant you would receive the radiation. It is a different thing. There are

two different things we are talking about. Radiation that effects the plants and then goes on by and is not in the plant. There is not radioactive material in it to harm you, or radiation material, radioactive materials that are taken up in the plant which you eat. These are two different things. The statement here is the radiation levels which we have experienced in the Marshalls have never been seen to do damage to a plant.

deBrum: Exactly, Roger, this is the question that he is bringing up. It is a legitimate question.

Ray: Yes it is.

deBrum: Why is it that we are not recognizing it to be a dangerous level and yet it is restricted? Why? So that we can explain it to the people. Why can't you go there if it is safe as the book says. We find it difficult to explain it to women who want to go back to Bikini, women who want to go to certain islands, when you say, as the book, that it is safe?

Ray: The principal matter of concern for people going back to Bikini to live is what their diet will be. What they will eat? How much radioactive material will they take into their bodies?

deBrum: (not clear)

Ray: We are saying in the book that the plants would be harmed only if the radiation levels were higher. The plants themselves, not that the plants would be contaminated, but that they would be harmed. This simply says that the plant will come back. We know, we've seen that plants do grow. They flourish no matter what the levels of radiation is in the soils.

deBrum: My second question, (not clear) so that we can go on with this. Can we, can these people make a copy of this book to study and let their own scientists and analysts interpret as they see fit?

[redacted]

have a nut, to bear a nut?

Muller: I guess what he is leading up to, is that we have those things happening.

(Laughter.)

Ray: We'd like to get some samples of these breadfruit.

Buck: Maybe we are getting worn out by this sort of thing. It is time to go...

Male Person: How much more have we got to cover?

Buck: We are ready to start Chapter 5 and Chapter 6 before the maps. We weren't going to go on to each individual map.

[Alice continued presentation in Marshallese.]

TAPE 3, SIDE 2

Marshallese: I am asking about cancer and birth defects, but primarily about cancer. How many cancers have appeared in the Rongelap population since the time of the testing of the bombs?

Bair: I don't know.

Marshallese: So, what is the meaning of 0.1?

Bair: That means that if people, that if people receiving radiation during the next 30 years, not in the past, but during the next 30 years, we would..., if they receive radiation on Rongelap for the next 30 years, we would not really expect any cancers to be caused by the radiation. But we are not saying there isn't a chance that there might be one. The risk is, I don't know how to...

Bair: One possible way; if there were 10 times as many people on Rongelap, if there were 2,000 people today and they lived and had children for the next 30 years, then there might be one person (receiving) having cancer caused by radiation. There might be.

Marshallese: If your figures here reflected the period from the time that the bombs were tested for a 30 year period, would you be able to make an estimate in figures that way?

[redacted]

diet to make these projections. Couldn't you use the same diet as the basis to make projections based on data (unclear)?

Bair: It is not a Battelle diet it is Brookhaven diet.

Cowan: Okay, whatever diet, you had to use some basis of food intake to make these projections?

Bair: You could do that.

Marshallese from Rongelap: I think that we have had a lots of data

[redacted]

gathered in our population at Rongelap and if you went to the labs in Seattle and looked into this, probably that could be determined.

Bair: I think Brookhaven is making a determination on the thyroid; the radiation, the amount of radiation the thyroid(s) of the people have received. I don't think their report is finished yet.

Marshallese: I'm just wondering. As we've already asked, seriously I wish that you could tell how many people might have died from cancer from the time of the testing until now rather than this figure which projects into the future.

Ray: I think the answer, an answer to that question is, yes, a study could be done. Our data and amount of information that we would have about those earlier days would not be nearly as complete as what we have now from the 1978 time. Nevertheless some estimate could be made. That estimate still would only be able to indicate the likelihood that, of those people who have died of radiation relateable diseases, some number might be attributable to the radiation.

Marshallese: I feel that this whole book is affecting or applicable to the coming generation, the young children, because in the next 30 years my age group and older will be gone. So this isn't really a report for us, it is maybe a report for them rather than us. And, also, that I detect that the results of the information in this book is reporting a time that has much less damaging effects, in fact, it almost looks rather clean in comparison to the number of years which are not included in this book. And, so from my point of view, I don't know that this is..., I would much prefer a book that gave the entire picture rather than half the picture and the better half at that. In fact I hesitate to go forward and say much about this book.

Ray: Well, I would just like to say again, the purpose of this book, that purpose was to provide a basis for informed decisions about future actions. That's the sole purpose of the survey, to determine whether there should be recommendations made for future actions that would protect people in the event that we found radiation levels that were of concern. That was the commitment that we made some time ago, for this particular purpose. This is not the whole story, you are absolutely right. (and) There are many reports published that deal with the past. Those are available and as I have said earlier, if there are specific questions I am sure that we would be willing to help with converting those, translating those, into your language so that they are understandable. That wasn't the purpose of this survey. It was to guide future actions.

TAPE 4 SIDE 1

Buck: They are addressing what the book is actually stating.

Marshallese: If I and my family live at Rongelap on one of these islands that has this largest amount of radioactivity, will myself or my family be affected, or have something happen to us, to our health, as a result of our living there in the coming 30 years? On one of those islands at Rongelap?

(Bair to Ray: The higher...?)

(Ray: Yeh, Naen, Melu, ...)

Bair: If they lived on one of the other islands they would receive radiation, an amount of radiation I think about 5 times or 6 times more than living on this island. And the risk would be...

Buck: Other atolls?

Bair: No, no. Other islands.

Robison: Yeh.

Ray: Naen as opposed to Rongelap island.

Bair: The Northern Islands of Rongelap vs Rongelap island, itself.

Buck: Did he ask about Naen?

Bair: Yes.

Buck: Did he ask about Naen or did he ask about an island with a high...? And I thought you were saying that other...

Bair: The higher one on the Rongelap which is Naen, it's in the north. The radiation dose, the amount of radiation they would get if they lived there, would be about 6 times more than if they lived on this, on Rongelap island. And the risk of having a health effect would be 6 times higher. (To Alice: How do you plan to translate that?)

(Alice to DOE Representatives: I am not sure how...)

Cowan: Does that mean that you could take 6 times that and that 3½ people would die of cancer in the next 3 years due to the radiation?

Bair: That is the upper estimate, the highest risk estimate that people would, that scientists would support.

Buck: This wouldn't be multiplied by 6. This is the high?

Bair: No, no. If they received 6 times as much radiation, than this risk number would be higher. It would be 0.6 to 3.6.

Ray: That would be for the entire population (of 233) living on and subsisting on Naen. Out of the 233...

Cowan: Can I use, ask what growth rate you used?

Bair: We assumed that the population would increase by a factor of 3.

Cowan: 3% per annum?

Bair: No, three times in 30 years, and it is based on the past increases in the Marshall Islands.

Robison: But that again, it is important to understand that, if you talk about Naen and the number 6 times greater than Rongelap, that's assuming that they live there full time and eat all their food from there.

Ray: Out of the entire population which would grow to 750 in that time, there would be statistically about 3.

Buck: Okay, I thought these figures were for the whole atoll of Rongelap?

Bair: That's just for Rongelap island.

Buck: Just for Rongelap. And, so the...Island?

Bair: That's what it says in the text.

Cowan: If people go to Naen from Rongelap?

Buck: Oh, I see. Eneaetok and Rongelap, Eneaetok and Rongelap are these figures. And now they are asking about Naen. Right. I was confused. Okay.

Bair: Really 5 times; it should be 3, 0.5 to 3 additional cancer deaths.

Marshallese: How many, what other island in Rongelap besides Naen have that same dose?

Robison: I think Naen is the highest, as I recall. And Melu is, I think, next. Let me just very quickly look here.

Buck: Alright...(background discussion.)

Buck: Oh, Melu? (background discussion.)

Buck: Jorkan? He is asking about Jorkan.

Robison: Oh, let me see. Naen is the highest, Kopale, or however you pronounce that, is next and then Eneaetok and Melu.

Ray: He was asking about Jorkan. Do you have it?

Robison: We, no we don't have it. (background discussion) We didn't calculate the dose for that.

Buck: Jorkan is down from Melu, two islands.

Robison: Yeh, the only thing. Let me look. We didn't calculate a dose for that island because that was never given to us as one of the residence islands. So I am trying to find here...if we even have... I don't even have that name. (Background discussion: No, you didn't do that one. You did Melu.) We have no data on that one. Except we have the external gamma data, which I can easily tell, it's it's like Melu, but I would have to look at that data first.

Marshallese: The northern part of Rongelap is the place that they gather a lot of their protein sources, you know, meats from animals. (Alice: You say what?) Pigs, crabs, birds. Even though they don't live there they like to go and gather these kinds of things from there.

Buck: Okay, let's have the slides that show these comparisons. And maybe that's sort of a good summary. I'm not sure we were going to pass these papers out.

[Alice continued presentation in Marshallese.]

Marshallese: Do you have a safety standard then for these? Where does the standard come with reference to these figures?

Bair: One comparison is that people in the U.S. who just get radiation from background would get about 2500 in 30 years. Which is the number right there.

Buck: For any part of the body?

Bair: Yeh, all parts of the body.

(Background discussion regarding average background dose in U.S., "Dose at Denver is higher.")

[Alice continued presentation in Marshallese.]

Buck: Is there anything higher than 0.2? This graph shows that 0.6.

Marshallese: This information is not in this book.

Ray: It is but it is not tabulated.

Buck: Oh. Yes. It is on each page.

Ray: I have copies of this tabulation if anyone would like to have a copy.

deBrum: Thank you.

Buck: They say they will save their questions for tomorrow. Further questions?

Ray: 7:00 tomorrow?

deBrum: 7:00? I don't know. No one, will be here, I don't think.

deBrum: How about 9:00?

(Background discussion - agreement on 9:00).

Male Person: 9:00 tomorrow.

DAY 2

Ray: Yesterday, we just undoubtedly scratched the surface of questions you might have, and I expect that we will have many more this morning. I would like to suggest that we try for the early part of our discussion to keep (to) those questions related to what's in the pamphlet and what that means. And, then if there are things, other things, you would like to ask about we will either try to answer your questions here or take them down and answer them later, or perhaps even suggest other places that you might get those answers.

Ray: To repeat then, our purpose here for this visit is to report and explain the results of a particular survey that was conducted four years ago, and to give you this booklet to take back and use in informing the people you represent of the work that has been done and its results.

Ray: Copies of that booklet and the scientific report have been furnished to the government and have been and will be furnished to anyone who has an interest, including lawyers, independent scientists, anyone to whom you wish to refer. And we are pleased to have it reviewed and both reviewed by anyone you choose.

Ray: May we now proceed with your questions?

Marshallese: I am referring to the paper, the supplement paper. If I understand that correctly, the instrument or the way of measuring of the radioactivity on Utrik and Mejit, was it the same instrument. Because it appears to me that the population of Utrik was moved and yet on this paper it shows that the contamination of Mejit exceeds that of Utrik. (and then by implication) Our population was not moved.

Ray: In response to the first part of the question, the same techniques were used at both locations and so these numbers are comparable. They are, they come from the same base of information. The population of Utrik was

moved because of a condition that existed at that time which no longer exists, and what this table shows, is conditions that exist from 1978 on. It does not relate to the one incident which occurred on March first in 1954.

Marshallese: Does this mean that the radioactivity at Utrik has decreased at a rapider rate than it has at Mejit?

Robison: Initially there was more activity, short-lived activity, on Utrik. And that exposed the people but went away very quickly. But, the radiation that is there now is going away at the same rate on both atolls.

Robison: And, the radionuclide concentrations at Mejit are less than at Utrik and the doses we estimate for Mejit are less than Utrik, although when you summarize the numbers they come out very close. But everything we measure and predict at Mejit is slightly less than at Utrik. It is less at Mejit than at Utrik.

Buck: So these figures represent for the body those for the actual atoll? (Background discussion.)

Robison: But they are close, there's not a big difference, but Metij's a little bit less than Utrik.

Marshallese: This paper says 75 for Utrik and 100 for Mejit.

Ray: We are making a check.

(Robison: Well, which one are they looking at, the annual? The maximum annual? Is that what they are looking at? (Further background discussion.))

Marshallese: Was that a typographical error, should it have been, that be 175 for Utrik?

[redacted]

and there Mejit would be predicted to be somewhat lower. So it is just a matter of...(Changed tape)

TAPE 4 SIDE 2

Marshallese: I wonder why a single diet wasn't used in your calculations rather than two. And we happen to have seen some of the Brookhaven data which seemed to be short on, for instance, on the amount of coconut liquid drunk, consumed. They predicted to say half a coconut a day and that's rather inaccurate.

Robison: Well, we realize that there is, there is some uncertainty as to the diet at each atoll. The diet is atoll specific. It varies from each atoll, and it is very hard to find out what the diet is at any one place. So we have two surveys that have been conducted, the most detailed that we know of. We have also looked at other reports. A report called the Lohr* Report from Majuro a few years ago and some reports from a lady named Mary Murai* who used to be in the Marshall Islands and did diet studies. We have tried to find all the information that we can in the literature concerning the diets in the Marshall Islands, and the best we can do, we have a range of information available to us, so we calculated the dose for both, both ends of that, to show that there is a range, a range of information available.

Marshallese: Did one of those diets come from Ujelang?

Robison: Yes, one of the sets of numbers we give in here is based upon the Ujelang diet. The other is based upon the Brookhaven diet. The Brookhaven diet is the higher numbers. And, just let me complete that, and the Brookhaven numbers, the higher numbers, are the ones that were used to give estimates on the paper they have.

Marshallese: I feel that all of the atolls, including Ujelang which is one of your samples which is one of the diets used, are in the northern segment of the Marshalls, and so that diet shouldn't really, significantly change atoll from atoll to atoll because they are all of the north. If you were to have compared a diet in the north with a diet in the south, like Joluit or some place like that, then there might be some changes. We would have more root plants that we consume. In the north, it is basically we have breadfruit, we have fish, we have crabs and then we have imported food, throughout the northern Marshalls. So why is that those numbers are so different, Ujelang and Brookhaven? That is the question.

* Spelled phonetically.

Robison: Well, I think the answer to that is that there is a difference at the atolls as to how much imported food is consumed. Some atolls appear to have more imported foods in their diets than others. Others, some atolls rely on more local grown foods than other atolls do and that's why we see the difference and that's what's been reported to us.

Robison: But, we did calculate the dose at each atoll using both diets. So in a sense, we did apply the same diets everywhere. Two diets, but we applied them both to every atoll.

Robison: I might also add for your information that the Brookhaven diet we refer to, was done by, primarily by a man named Jan Naidu who some of you may remember having visited. He lived at Rongelap for awhile and at Utrik, I believe, and he has also been to Ailuk. And it was on the basis of his observations and his questionnaires to the people at those different atolls, that's how he developed the different diets that he thought applied to the different atolls here in the northern Marshalls.

Ray: Ebby* also, was also...

Robison: Ebelyn Crayhead.*

Buck: What?

Robison: Ebby Crayhead. They might remember her. Ebelyn Crayhead.

Buck: Ebelyn Crayhead?

Marshallese: So can we say that this supplement page isn't exactly accurate then?

Robison: No, it's, it's accurate. It's based upon the Brookhaven diet.

* Spelled phonetically.

Ray: I think what should be recognized is that those numbers are very close together. Those, those numbers are hardly distinguishable from each other. If you look at the other page of numbers and look at the results in the cancers and birth defects between the results that were predicted between Mejit and Utrik, that the numbers are almost exactly the same. The difference between the 75 and the 100 between Utrik and Mejit is not a very big difference. They are both such small numbers that a very small change in the diet can make that difference and it really is not very significant.

Marshallese: How would you know that a person that died a month ago, died from cancer (I suppose he means from radiation induced cancer) on Utrik?

Ray: There is no way that we could identify or attribute a death from cancer to radiation. A specific death.

Marshallese: How do you know that a person died of cancer? That's the question.

Ray: We have no way of knowing except if there was a medical record made at the time that the person died. If the doctor's examination concludes that the death was caused by cancer.

Marshallese: I think probably that you are aware that we have no medical doctors on these outer islands. So that information is not possible. No one can inform you and tell you from the perspective of a medical doctor's diagnosis that a given individual did die of cancer. We don't have that verification so, how can you then predict how many might die of cancer? And these figures say that.

Ray: These figures are not records of what has occurred. They are predictions based upon the best scientific knowledge that is available to us today. Predictions of the results of these radiation exposures to people. They have nothing to do with past history or actual deaths. They are predictions of how many deaths, how many additional deaths might be expected to occur if people live on this or that island.

Marshallese: Do you base these figures on what has happened in the past?

Ray: Those are based upon what has happened in the past and upon experiments, studies that have been done with animals and examinations of people.

Bair: Not on past experience in the Marshall Islands.

Ray: No, not Marshall Islands experience.

Marshallese: So I would think then that these don't really apply to the Marshalls, these figures, then, because why would you need to go to a laboratory to get information like that? Why didn't you come and actually visit the Marshalls, and take your data from the Marshalls, and base these figures that apply to us on our actual experience?

Ray: These numbers represent the best scientific estimate we can make of the consequence of radiation, what contribution radiation may be expected to make, to deaths from cancer in the Marshalls. We have no way of identifying a specific death and saying that is due to radiation. But the world's experience at this time would indicate that with these radiation levels, whatever the number of cancer incidence is in the Marshalls would be increased by this much. We don't know what the incidence of cancer is in the Marshalls or has been because there are not sufficient historical records. We do know that, worldwide, of all the people that died in a year, of every 6 people that died, 1 of them probably died of cancer.

Marshallese: We feel that the DOE vessel makes regular trips to these atolls and so seeing that that would be a perfect opportunity to gather information from these atolls and base your information then on data you gathered on site in our area and, (implied), you wouldn't have to resort to worldwide figures.

Ray: Well, certainly as the DOE vessel visits the atolls of the Marshalls we gather as much information as we can. But in order to make judgments of

averages that we are now using.

Buck: May I please say something that you said in the last sentence, which was there was no way of knowing how many deaths from cancer there have been, have died. I failed to translate that. [Alice continued presentation in Marshallese.]

Marshallese: You have been examining the Marshallese population for a period of 28 years, I believe. Isn't that a long enough time to make some kind of assumptions?

Ray: We have been examining a very limited population of Marshallese people for that period of time and they were people who were exposed to very large doses, relative to these they were very large doses. We have a pretty good understanding of the results of that kind of exposure. But here we are talking about very much lower doses over a long period of time. There we were talking about a high dose over a short period of time and they are not comparable.

Marshallese: This paper seems to indicate that the contamination of Mejit exceeds that of Utrik, and so isn't that enough for the Americans, the U.S. government, to say, to actually announce that Mejit has more contamination? They are making compensation to the Utrik population, but not to the Mejit.

Robison: Let me try, let me try to do this, to explain why it looks this way. If, if we look at the radiation in the soil and in the plants at Mejit it's less than at Utrik. But the Brookhaven people have two different diets, and Brookhaven has told us that they believe that over on

Robison: If, if we actually use the same diet and made the calculations on the same diet at both atolls, then Mejit would be less than Utrik.

Robison: It's because the Brookhaven diet, the information we have from the Brookhaven people on their diet, says that there are more imported foods used at Utrik than at Mejit. In other words there are more local foods at Mejit and that's why it makes that look the same.

(Buck to Robison: Make it look the same?)

(Robison to Buck: Well, we are saying that they're similar. Say similar! It's very hard to distinguish between those two numbers.)

(Buck to Robison: I am afraid that's what's misunderstood.)

(Robison to Buck: It looks like a big difference to them.)

(Buck to Robison: Yeh, looks like a big difference.)

(Bair to Robison: Bill, it shows on page B-3, it shows the soil concentrations.)

(Robison: Yeh, that's what I am saying.)

Robison: If you, do you have this report everybody?

Buck: September 30.

Robison: B-3 in the back. In the back of the book.

Buck: B-3

TAPE 5 SIDE 1

(Background discussion)

Robison: Okay, now, if you look at this first, second column of numbers. This column. Look at Mejit, 0.56. If you look at Utrik 2.4. And that's, that's the concentration that we find in the soils, so that, so that Mejit is less than Utrik, but because of the Brookhaven diet saying there are more imported foods than Mejit, it makes them come out about the same.

Marshallese: Is this book, was this book made in 1978, or just this last year because supplementary food to Utrik just began last year?

Robison: These numbers are calculated starting as of 1978. And when we say, when we say for 30 years then, it's 30 years beginning in 1978.

Marshallese: What food did we eat beginning in 1978? I am from Utrik, what food did we eat at that period beginning in 1978 from outside. We were eating just like the Mejit people. We were eating from our own soil.

Ray: The... Let me come back to your question in just a moment and first say something about diet. When we first starting doing this sort of calculation, its purpose was to make, to assist the Enewetak people in making some plans for resettlement at Enewetak. With all of the best advice we could get about the diet of the people, we did not feel that we had a good understanding of what might be the diet of an Ujelang people now removed and living at Enewetak.

Buck: Of an Ujelang people removed...?

Ray: The Enewetak people who were then living on Ujelang were to return to Enewetak, and we did not feel we were confident that we could predict what their diet might be at Enewetak.

Ray: Micronesian Legal Services, Ted Mitchell, offered to do a survey and advise us on behalf of the people of Enewetak what they thought their diet would be and asked us to use that diet in doing calculations for Enewetak. That diet then, that diet study was not one done by us, it was done in behalf of the people of Enewetak by their council.

Senator John: I would like to speak on behalf of that information which we have just heard which indicates that the assumptions and data are based on something done by our lawyer named Ted Mitchell. (and) I have no confidence in that man and besides I don't believe he came to me in any respect. I can't really trust his data. If he provides you that data and I know that man and I can say that I would not trust that information.

Ray: And I accept that as what you say, Senator. I was simply explaining, "What is the Ujelang diet that we have been talking about?" Why do we have something called an Ujelang diet? We requested that the people of Enewetak cooperate with their attorneys to provide us that and that became the Ujelang diet. Whether it is good or bad I don't argue, but that's where it came from, for the benefit of others here.

Marshallese: This is what has caused confusion then, because...

Ray: All right, but may I continue though?

Senator John: I would like to just further say that that man, Ted Mitchell, was a lawyer and not a scientist. So it seems strange that scientists would use data provided by a lawyer.

Ray: We understand. And for, as a matter of information it was Mike Pritchard rather than Ted Mitchell who did this, but that is neither here nor there. Mike Pritchard, also a lawyer, went to live with the people for a period of time that he felt was satisfactory. We had no choice but to accept what the people's council told us should be used. Now, I want to get on to the other diet, though, and how we progressed to what we have now.

[redacted]

Marshallese: [redacted] days.

Ray: I understand. I don't question that. But I do know that he lived in a Marshall village, I believe it was either Rongelap or Utrik, and it must of been, then, Rongelap for a number of months.

Marshallese (probably from Utrik): So is this figure, 0.56, that is in this report, can I go back and say that that is inaccurate because Ted Mitchell did it?

Robison: No. No, that, that data...

[redacted]

people that it is inaccurate?

Ray: No. That number is based upon the John Naidu numbers. Whether they are good or bad, it is based on the John Naidu numbers.

Buck: But this will be a cause of consternation or confusion among my people if I go tell and them that these figures were based on an assumption that they had diet, had things added to their diet from outside, supplementary foods beginning in '78 because that's not the case. We did not have that since '78.

(Background discussion)

(Robison: That's speaking from where, Mejit? That's from Utrik?)

(Ray: Yeh.)

(Robison: That's from Utrik?)

Ray: It is based on some imported foods, but that is a rather high intake for local foods.

English Speaking Unknown Male Person: There was some ___?___ with the school lunch program as I recollect. I am almost positive. Maybe you can check with...Maybe that had something to do with it. But there was some U.S. Department of Agriculture food on the islands.

[redacted]

and I don't want to stop that discussion if you feel that it is productive. It seems to me that it might be appropriate to suggest that if the Mejit council or if the Utrik council feels that the diet which is spelled out in this report is in error and would inform us of that and how it is in error, that a new calculation could be done.

(Buck to Marshallese: He is the chairman.)

(Buck to Ray: You have to acknowledge one of these.)

Ray: Yes, sure.

Buck: He has given that...who are you acknowledging?

Ray: This gentleman right there.

Marshallese: I am very pleased to be recognized. I appear in response or represent or with the interest of Mejit at heart so I am very pleased to be

recognized. Thank you. I have a few questions. Because of the survey, my first question deals with the fact that the Wheeling, U.S.S. Wheeling, came in 1978 and you are saying that by coming and surveying our island at that year, you are able to predict how it is going to be for the next 30 years and you can say that with fair accuracy and you claim to know more about that than you do about the preceding 30 years? You can do that kind of..., this information, you are able to talk about, which is not yet here on the basis of that survey, better than what preceded that?

Ray: That's correct.

Buck: The years preceding...? (Oh, all right.)

Marshallese: I would like to say, with 1978 as a starting point, you are moving forward and say that you can give information regarding that time slot and are not giving information about the time slots preceding '78 back to the time of the bomb tests? That interval?

Ray: Our purpose in this survey was to make those predictions and so this survey is, was an attempt to learn everything that we could about each of the atolls, Mejit included, starting at that time. Had we taken a different, had a different purpose, to write a history about what had happened before, we would have done a completely different thing. And we are not reporting on that now, we are reporting on this survey.

Marshallese: When the Wheeling did come, you gathered samples of soil which had in it residue from something that happened prior. You took samples of pig and chicken and even blood samples of people and that is all, it seems to me, a record of something that happened rather than your data is gathered by something that precedes that year, and yet you are not talking about that, you are talking about the future. Is that accurate?

Ray: That's correct.

Marshallese: That is your purpose? That is your major purpose?

Ray: That is correct. That was the assignment that was given us, to do that. There is no question that some of the information that we obtained during the Wheeling survey could be used for a separate study, if one chose to make such a study, of what that means about what was 10 years ago. It would not be as precise as what we can do about predicting toward the future. But we could make some, we could draw some conclusions from what we see today as to what was there 10 years ago.

Marshallese: I still feel a little confused with that information but let me go on to my third question. So, now regarding the diet of Mejit and the, specifically the foods grown in the soils at Mejit, I want to know is there any harm to us, the population of Mejit, by our eating plants that are grown in our own soil at our own atoll, our own island?

Robison: The doses that we estimate and that are on the sheets and in the pamphlets we have, are based upon the Brookhaven diet and those are fairly high amounts of intakes of coconuts, and the doses we predict for Mejit are no higher, the total dose we predict on Mejit, are no higher than what most other people in the world live in and get exposed to, in fact, less than most.

Marshallese: My question is will we have any harm result from our eating this food? Will we have harm come to us or not?

Bair: You should not have any harm come to you from eating the food from Mejit. If you look at the table you will see that the highest amount that anybody on the, on Mejit would receive in one year is 100 mrems. All over the world the governments are prepared to allow their people to have as much as 500 mrem per year. That's a radiation standard that is accepted all over the world. So you see that even the highest person, which is..., the highest person would only receive 100 mrem. This is one-fifth of what would be allowed in all countries of the world.

Bair: I might just add that most people, almost all people on Mejit will receive much less radiation than the 100.

Marshallese: So I just understand now you to say that we would not have any harm come to us from eating food raised on our island.

Bair: I don't think so.

Marshallese: I have one more question but may I have your name please, that answered me, that question?

Bair: Dr. Bair.

Buck: Dr. Bair. B A I R.

Buck: Bill Bair. William Bair.

Ray: Alice, show him that name in the back of the pamphlet.

Marshallese: I have one final question. I am ___?___. I want to describe two surveys we have experienced. We experienced the Wheeling trip and that survey which I have already mentioned was quite extensive. Plants, animals both land and sea, and our personal, our bodies, our health, our blood samples and so forth. Since that time the Loma Linda team has come, a man and a woman came and also conducted a survey at Mejit. They spent one week on our island and they just brought a book and a pencil and a camera, in other words they had very little equipment with them, and they asked questions such as what is the population and then we were invited to ask questions and we asked could we be examined, have physical examinations and they said no.

Marshallese: We also asked could they please tell us what they understood about our island, our soil, our food. Is there, what do they understand about the radioactivity, say of our plants, and they said we cannot answer

those questions. They asked us what animals, what animal life do you have on your island and we answered that we have pigs, chickens, cats, rats and dogs. We fed them, we gave them food to eat while they were with us of our diet and then they left. And so I am not a doctor and I sure don't know the answer to this, but how can you accept their data and use it as part, of say, your survey or anything if that is all they did while they were with us.

Ray: I believe that was the year after the Wheeling. Is that right? Soon after the Wheeling was there that the Loma Linda group visited. Their purpose, that Loma Linda group, was to do a study to advise the Department of the Interior in their health planning program. To plan health planning, what changes in health care might be needed and should be adopted in the Marshalls. They were not there to examine people or to do any radiation studies. They are not radiation specialists at all. They were looking at the conditions under which health care is delivered in the outer islands in order that they might help the Department of Interior with plans for future health care.

Ray: Their studies were entirely separate from ours and we do not depend on anything that they learned as a part of this study.

Marshallese: Okay with that answer, then I do have one more question. Did I hear accurately that there was a part of the Loma Linda research used in anyway in this report?

Ray: No. In no way.

Marshallese: It seems like I heard one of the other men refer to the Loma Linda people when they were talking just a few minutes ago about comparing Mejit and Utrik.

(Ray to Robison: You did mention some other people, Mary?)

Robison: Mary Murai.

Ray: Mary Murai. And was there another, somebody else at Berkeley? I know what it was, you made reference to a Laurie Report?

Robison: Laura Report, which was developed here at Majuro a few..., Laura Report.

Buck: Laura Report (unclear) Loma Linda, Laura?

Robison and Ray: No. No, not Loma Linda.

Buck: That's what I say. It was not Loma Linda. It is Laura.

Robison: The Laura report. It was one developed here in the Marshalls on Majuro and that was what I was referring to. It just had some information in there about, about average daily intake of coconuts, that's all.

Buck: Jan Naidu and Ebby? That's a man and a woman. They were from Loma Linda?

Ray: They are Brookhaven, Brookhaven.

Marshallese: I am requesting permission to ask my magistrate if he has anything further he would like to ask before conceding to other members of this party.

Marshallese: I appreciate this opportunity but I don't have any pressing questions at this moment. Perhaps later on I will. But thank you, I am satisfied with what they said.

Ray: We have one in the corner that has been waiting a long time.

[redacted]

it is benign and if it is malignant, its another kind of incision? I just really want to know about this because I've heard there are two kinds of thyroid. Cancers in the thyroid.

Ray: That's certainly true that there are benign, and benign thyroid tumors and malignant tumors. It is also true that they are varying in size and so in that aspect the incision might be smaller with a smaller tumor.

Buck: Is benign smaller than malignant or is that...

Ray: Not necessarily.

Buck: No, not necessarily.

Ray: It is just a matter whether one is cancerous and the other is not.

Bair: Maybe we should point out that there are far more benign tumors in the thyroid than there are cancers in the thyroid.

Ray: I guess I would like to also point out that we do not have a thyroid surgeon here answering these questions and, and if that is something the gentleman would like to pursue it would be better to do it when we have a physician or a surgeon here.

Marshallese: If we are considering bringing a doctor for this kind of consultation cause our interest is high I would request that we have more than one doctor. I would like to have a doctor from the U.S. and a doctor from Japan.

Ray: I think that is a request that we that should be discussed with the government of the Marshalls and we'll certainly discuss it.

Buck: Okay to recognize...

Ray: Yeh. I don't see any more.

Marshallese (in English): I have got two more.

Ray: Okay.

Marshallese: This isn't necessarily a question, it is a comment or an observation that I personally have so I would like to just bring it out right now. I am aware of the fact that women who wish to have an operation performed so that they will no longer have be pregnant, I suppose it would

be like a hysterecotomy. Formerly that used to require quite a large incision and now that has been refined to the point that it is very, kind of a small incision for that particular operation. So I am wondering why there hasn't been an advance or that same kind of improvement made in the thyroid incision. How come it is still just as big as it has ever been?

Ray: I suggest that that's another one to refer to Doctor Dobbins or one of the thyroid surgeons who comes out, on the regular visits.

Marshallese: Now my question is referred to studies that are made by the Department of Interior, as well as your own studies, and I'm wondering if the incidence of diabetes and the incidence of thyroid cancer or thyroid, is that the same between the Marshalls and Yap?

Ray: I don't believe we are competent to answer that question unless Dr. Bair has something to say about it. I think that's a question for the health services people, to answer. Those who have records of health care.

Marshallese: Well, then this gives rise to my next question which is, isn't that, isn't our diet, the assumption about diet, isn't that something that actually a physician should be addressing and talking about?

Ray: Not for our purposes. Our purpose in discussing diet is not to be discussing nutrition and the value of the food that you eat, too, to your body and whether that diet itself causes illness, but rather to use the diet as a measure of how much radioactive material is taken into the body. We do not concern ourselves, when we talk about diet, with whether that diet might result in diabetes or any other illness. That's beyond our, the scope of our study.

Marshallese: All right, it is clear, it is clear that you are not talking about nutrition but you are talking about the entrance into the body of radionuclides through the food chain. And you are not doctors, so how do you know this. How do you know, how, what..., how can you tell us the

effect that that, in our diet to the various parts of our body which was described. You're not doctors and yet you have approached this subject.

Ray: Yes, Dr. Bair.

Bair: I am a scientist. I am not a physician. I have studied radionuclides in experimental animals for 30 years, so I feel that I do know what happens when radioactive elements are taken into the body and the effects that can result from that.

Bair: One other thing. We know in comparing our studies with what information is available about human beings, that animals and human beings are the same. The information we have from animal experiments can be applied to human beings.

Marshallese: Yes. I think I understand. Thank you for your reply and I understand in this way that by being a scientist and studying animals, you are able to, then, also understand how certain things affect human beings because animals react very similarly to human beings in this respect. (and) So I am just assuming like you may have a rabbit in your laboratory and you may feed this rabbit and observe it, then, and by determining that when you find out that the rabbit gets something, for instance becomes diabetic, then you can assume that there was a relationship between what it was eating and it having that disease. (and) Then you say because of that information you can also apply this to people. Is that accurate, is that what you are saying your study of field of expertise is?

Bair: That is accurate, although I would like to mention that in none of our experiments have we seen diabetes caused by radioactivity.

Ray: I'd like to make one additional point on that subject. In addition to doing these predictions, when we use the diet that we assume, and then from that conclude that a certain amount of radioactive material will be taken into the body and stay there, thus, there to cause radiation of the

[redacted]

radiation stays in the body, concerns everybody and the thing that concerns me is that you made projections of the harm that will happen to people based upon the conditions that were found in 1978. Back then and looking forward. And how do you take into consideration the amount that people already consumed prior to 1978? In particular, because the half-live of two of the most common radionuclides is around 30 years. I speak of cesium and strontium.

Ray: Well, I refer you again to the purpose of the study. The purpose of the survey and the study. It is and has been to determine whether or not it is reasonable for people to continue to live in these locations, or whether there are things there that would influence us to make recommendations, either about changing the diet, changing the lifestyle, changing the place of residence or otherwise. Those things we can do something about if we know, if we were to find in this study that there is some practice which is leading to unnecessary exposures to radiation. We can then make a suggestion to the people concerned as to how they can moderate that as would be done, for example, when we find that the foods from the northern islands of Rongelap are significantly more contaminated than those in the southern islands. The suggestion there would be that people not take a substantial part of their diet from the northern islands but use, to the extent that they use locally, locally grown foods, the foods that come from the southern islands. I repeat. That's something we can do something about. By giving advice and recommendations we cannot today do something about what happened ten years ago. And the purpose of this, although there are other studies that look at ten years ago or twenty years ago, this is not that study but what we are reporting upon is a study as to what conditions are there now, in order that people can make decisions about their own lives.

Cowan: That does not answer my question. My question is how can you make recommendations for the future without taking into consideration what they already ingested, people already ingested?

Ray: The recommendations that we make have to do with whether or not there will be unnecessary future exposures, exposures or doses that could be avoided. We have also separate from this study, we have also knowledge of the doses and exposures that people have had. We have knowledge, by virtue of the whole body counting program, of how much radioactive material people have in their bodies. We have had those studies going on for sometime. Those are not what we are reporting here. If you would like to read about those, we have extensive reports on those. This is talking about a survey for a very specific purpose. Providing for future planning of people of the northern Marshalls.

Ray: A principle of radiation safety is something that we call As Low As Practicable, not as low as possible, As Low As Practicable. And the thought there is that one may accept some exposure to radiation for some presumed or expected benefit and it is in order to help people make that judgment that we need to have these numbers. These numbers have to do with the future.

Cowan: I understand the intent of the course for future planning but another theorem of radiation is accumulated whole body exposure. That's the amount accumulated over one's lifetime. I, I question the validity of predictions based on '78 forward, they don't take into account somehow the amount that has already been accumulated.

Ray: Well, that is why I referred to the principle of... (I'm sorry go ahead and translate it.)

Cowan: You didn't factor this into these predictions?

Ray: Let Alice translate your question.

Ray: We recognize that there have been exposures of people in the northern Marshalls. But the degree or the amount of exposure in the past does not affect the prediction of what the exposure will be in the future. They are independent of each other.

Ray: You have one Phillip?

Muller: My first question, I was, I think that it has been announced or recognized that there are four atolls that have primary contamination and those are the ones listed, Enewetak, Bikini, Rongelap, and Utrik. So why study other islands if actually there are only four that have high contamination. Why bring in other atolls to this study?

[redacted]

comprehensive look beyond the four to atolls close in, but further out than these four, to assure that there is not someplace that we had missed or that there is not some condition that we had missed.

Ray: Some of the techniques that we developed in the studies, especially of Enewetak and Bikini, made it possible for us to do this wide area search of many hundreds of islands, or several hundred islands in a reasonable time. A capability that we had not had years before. As soon as that capability was there and since we had to bring the ship out especially to look at Bikini, we decided that it made very good sense to go and make this last check to be sure that there was not something there that we did not know about.

Ray: The result of this, of this survey has verified that the choices we made for study in earlier years were good choices.

Marshallese: So now this chart or the maps on page 8 and 9 indicates that there is some contamination of other atolls besides the four that we all have been familiar and knew had some contamination. So America, as a government, the United States government, is willing to obviously then recognize that fact and say, yes, there is contamination of other atolls besides the four that we have been working with prior to this time.

Ray: Yes, there is some and the amount is reported in the survey report.

[redacted]

Kay: What we are saying is that with the exception of Bikini Island, the, all of the locations we have studied, Bikini Island rather than atoll, all of the locations we have studied would meet the standards, stay within the standards living in those places. However, there are places where choices can be made to keep the radiation exposures of people lower, even, by, for example, restricting the intake of food from the northern islands of Rongelap. That seems a smart thing to do if there is an alternative and there is.

Senator John: Thank you for your reply and it seems like now that's a little different from what I understood you to say yesterday. It seems like yesterday you were saying everything was fine and dandy and now you at least say, separated Bikini island out. I would like to now ask about Enewetak. I would like to ask about that if you are going to talk about Enewetak. And then I would like to be heard again after he's finished.

[redacted]

and the dose expectations for living on Enjebi have been reported. It falls within this same range, the range of numbers that we're talking about here. Bill you can help me with what they are.

Robison: It is very near the guidelines. It is right around the guidelines for that island.

Ray: Enjebi is very close to the guideline, very close to the standards.

Buck: Close to the standard?

Ray: Close to the guidelines.

Senator John: Okay, well, I would really like a clarification on Enjebi then, since I have heard what you have just said. I understand, that, I know that there has been plenty of breadfruit planted for experimentation, for observation at Enjebi and we are in a situation now where we're hungry. We have, and there are plenty of ripe breadfruit at Enjebi. Would I have your recommendation, permission to notify my people that they can eat breadfruit from Enjebi, that breadfruit which is grown there and that was in a test situation but is ripe and ready to eat and we need it? We are out of food at other places, so can we go to Enjebi and harvest breadfruit there?

Ray: Well, I think the answer is clearly, yes you can. But if there are substitute locations, substitute sources which would have lower radiation levels we would recommend that those be used.

Senator John: Well, thanks, I'm, I'm glad to hear that, that we can use those breadfruit from Enjebi. But it seems funny that you add a "but" right away as soon as you say that, when in actuality we've had a storm hit us and we only have very young trees planted on other islands in the atoll and, even though they weren't full grown, they had produced some breadfruit, sort of out on their trunks almost, not even on the ends of the limbs where they usually appear. But they were there, but these have been blown away. We really can't harvest breadfruit from other islands, but they are at Enjebi. We got good breadfruit at Enjebi and, so, we don't have a choice. You say if we had that choice you would recommend using some other. Well, that choice isn't there, but we do have those breadfruit there, so, I'm glad to hear, then, that you say we can use those.

Ray: That's correct. I would like Bill Robison to comment on that.

Robison: Yes, Senator, we planted the breadfruit and pandanas and coconut trees on Enjebi, as you know, as part of our program in order to better evaluate Enjebi Island. As you know there were no foods available for us to directly measure and we had to predict what we thought the concentration would be in food products at Enjebi by knowing what was in the soil. So we planted the crops, so that we would have samples to directly measure and, therefore, we could make a much more precise estimate of the doses on Enjebi. And therefore, we need those for samples, and it takes quite a number of breadfruit and quite a number of pandanas fruit and a quite a number of coconut in order for us to be able to make the analysis we need. So we planted those for a purpose and we do need them for a purpose. We do not, we do not need them all but we do need...

[redacted]

[redacted]

designates a range and it doesn't mean that an island that has a 4 is necessarily the exact same number. It just means that they are in a range somewhere and they can be different.

Senator John: I have further questions, later on, but I will defer now to others and I am just concerned though, too. I feel I am a bit confused and therefore I am fairly certain that people on the outer islands will be perhaps as confused as I am and, even more, with this kind of explanation that we are hearing.

Buck: There is a hand over there.

Ray: I wanted, if I may, to go back to Senator Ishmael John's, question about Enjebi and I want to leave that. Recognizing that you do have a problem because of the recent storm, and because things are not yet producing on the southern islands, we would not recommend against your supplementing the diet on the southern islands by some foods taken from Enjebi. On the basis of any radiation concern we would not recommend

against that, or any health concern. But we would plead with you, to not destroy the 8 years of work that has gone into trying to understand what's going on there by, by taking all of the crops off Enjebi.

Senator John: May I reply to that? Well, then, I just want to remind you that the first part of this year, I believe, DOE sent their ship up, and we had a body count of our population or, you know certain of our people. And some people who had not showed contamination before, or at least a certain amount, that had risen and so we were asked, those people were asked, "Well have you been drinking coconuts from Enjebi?" "Yah!" "Have you eaten some breadfruit from Enjebi?" "Well yes." "Well then that is why your body count has risen." And so look, we have already been told that and now you are saying that we can go do that. And yet that, it is obvious that we are gonna, our body counts are going to rise, because if we go and do that.

Ray: That is absolutely correct. It will rise, you would expect that, and that is one of the reasons we have the whole body counting program, in order that we can anticipate and see before that rise becomes a matter of concern. All of us have a fluctuation in our whole body count throughout our life. This is occurring all the time. I would compare it, Senator, with your doctor who may put you on the scale and weigh you periodically. If he has put you on a diet, I am not speaking of you of course, this would not apply to you, but if your doctor should think that someone was gaining too much weight, he might put him on a diet and make some recommendations to him and then he will periodically weigh him. And if he finds that he is getting too heavy, too fat, he will make some new recommendations. The whole body counting is very much like that. We use the whole body counting to monitor what's happening in the population and the fact that we come back and yes, your number has risen, does not necessarily, does not mean that there is any expectation of illness from this, but it may mean that we would suggest that you try to change your diet some and not let that continue, not let it rise continuously.

Ray: Is there another question over here? Yes, sir.

Marshallese from Wotho: We from Wotho are glad to be in this meeting and thank you for the report you have prepared for, not only our atoll, but other of the northern Marshalls atolls and I just am wanting to give my greetings. This is the first time for me to raise any, to speak and so I want to say that the Senator from Wotho and myself do have some questions we would like to raise.

Marshallese from Wotho: In this supplementary sheet, we notice that the number of, that is given for the yearly amount of radiation for Wotho would be 30. We, our question is, does this 30 refer to a single year or is this 30 beginning from 1978 to the present? Is that a four-year period that that 30 represents or is that a one-year period?

Ray: That represents the largest amount for the person who might have the most radiation in any one year. In the highest year.

Marshallese from Wotho: So, now, thank you for that reply and now if I understand it, then, from 1978 a person could receive 30 and then '79, 30, and '80, 30, and '81, 30, '82, 30--that would mean that a person probably then has 150. Is that, is that, am I to understand that?

Ray: Well, you are right that it is accumulating, but the 30 is the highest year. That's in the 1978 year. It is diminishing slowly, by several means. It's going down each year, so it will not be 30 the second year, it will be something slightly less than that and it is dropping off. So that over the 30-year period it adds up to only 200. If it stayed at 30 for that 30 years it would be 900 but it's dropping off.

Marshallese from Wotho: What is it, what is it that keeps decreasing?

Ray: The strength of the radiation is decreasing as a natural process. It decays much the same way as a fire dying down.

Ray: Let me continue Alice, please?

[redacted]

arrowroot. Utrik and Likiep have the same conditions. All the northern, northeastern, all the northwestern atolls.

deBrum: The question is, assuming that the radiation is the cause.

[redacted]

Marshallese: I wonder why it is that the people came and tested bombs in our area before knowing the effects that it would be, for our people and our land. Why didn't you conduct some experiments in other, you know, places before you did that? It seems rather presumptuous (Alice: That's

not the word), seems like you quickly began testing in our area before you knew what was going to happen. We wish that you would have had some way in knowing this before you came and did it in our area. What would have been the environmental effects.

Ray: Well, I find it, I find it hard to explain the actions of President Truman and the United States government leadership in the decisions that were taken in the 1940s and later. However, at least the history tells us that there were very serious threats to the security of the world that the United States was attempting to deal with.

Ray: It would take a long time and much study to judge whether this was the best place or the only place or the ideal place to do this work. In my opinion there is not serious question about the fact that at that time in the perception of the United States government leaders it needed to be done. To have had a complete understanding of the environmental effects ahead of time, would have taken many years, and I believe that at that time the leadership of the United States and the rest of the free world believed that there was not that much time available. The extent and degree of risk, the extent and degree of lasting effects, I'm sure were not well enough understood then. I am also sure that the men who made the decisions thought they did not have the time to evaluate that before we, the world would have been in much worse trouble.

Ray: Any pending questions?

deBrum: The motion on the floor is that we probably have lunch, first.

Ray: Alright, I will second that.

Male Person: All in favor, probably.

AFTER LUNCH

Ray: We are ready to entertain additional questions.

Marshallese: I have a question. If I understand correctly the Department of Energy is the department that is responsible for understanding about radiological effects and energy in general, and you have in this graph on page 12 showed information regarding the duration of radioactivity of certain elements and some, it is pictured here, as being very short-lived and some are longer and you gave an example of one which is say 30 years as a half life so, my question is: Since you are the ones now that are active in studying this and understanding it, why did you make your survey so many years, like it was done in 78 and you realize though that something such as the top two elements, they are not present, they do not exist after, in that period of time and so it seems like you who understand this, delayed certainly your survey for, it is obvious that you made it after some elements were no longer even present in the soils? If this information is accurate, which we assume it is, then it seems interesting to me that the survey was made years after some of those have dissipated.

Ray: That's a most appropriate question. In fact measurements and surveys have been made since the first test at Bikini in 1946. In the locations where most of the radioactive material fell, these surveys have been made most frequently and continuously, for example, at Enewetak, at Bikini and later at Rongelap and Utrik. This survey and this report were an attempt to summarize at one time the conditions throughout, whether or not we expected to find anything significant to health. As I indicated this morning we did not have, until recent years, the ability to do as extensive a measurement as we have done in this survey.

(Buck to Ray: You mean by ability, equipment?)

(Ray to Buck: That's right equipment and technology if you can..well yeh, equipment, measuring instruments.)

Marshallese: It seems like yesterday a statement was made that would tell us that a person who lives on a given island that is contaminated, if he lived there and did not eat food from that island, that it would be

[redacted]

measles. We may have a threshold where we can and not be susceptible because we have had that all along and yet a population that had not had that would be real susceptible to harm from measles because they don't have any immunity to it. Now does that work in the case of radiation? In other words would you have been less effected, because it is your product than we, and it was not our product?

[redacted]

caused this and, it is, we are concerned about it and that is just relatively recently that has happened.

Robison: Which island was that, just for my own interest?

Ray: It's right here.

Robison: The small one down here.

Buck: E N E J A. And he says there is another one there which we haven't named. Two of them in that area.

Buck: Oh, just that one.

Robison: Okay thank you. I just wondered which one he was speaking of.

Ray: I'm sure we don't have any explanation for that.

(Bair: It's not radiation, Roger.)

Ray: We can say with considerable confidence that there doesn't seem to be any plausible radiation explanation for it.

Marshallese: I am asking regarding an island in the Rongelap atoll and I am to understand that you say that the northern part of Rongelap is hazardous?

Ray: What we have said is, that the foods that might be gathered from the northern islands of Rongelap have radiation levels considerably higher than the foods, similar foods from the southern islands. And that given a choice we would recommend against using the foods from the northern islands as an important part, as a large part of the diet.

Buck: Would you explain what kinds of foods is it that we should steer away from, that are raised in the northern part of the atoll?

(Robison to Ray: I don't think we steered away from any of them.)

[redacted]

can but take care, that's where we got a mixed message, and I think that is confusing to have that kind of an explanation offered.

Ray: Well, Senator my doctor tells me that I need not stop eating eggs for breakfast. But he tells me that I would be wise to eat no more than perhaps 3 eggs a week and it is that sort of thing that we are trying to impress here. That, if you have a choice and have an ample diet, adequate food from the southern islands from Rongelap, then in the long run you are better off to not eat foods from the northern islands. At the same time if there is a shortage of food on the southern islands, we don't want to say, "don't eat it at all," because you don't have food on the southern islands. It is a matter of how much and how often and for how long. If there is a

[redacted]

the bulk of the diet should come from the southern islands. But people need not be fearful if, for one circumstance or another, caught overnight in a storm in the northern islands, or a shortage of some particular food in the southern islands, that they consume some food from there. It's not an abrupt difference. It is a matter of degree.

Marshallese: I'd still like to just kind of think of examples of what might be the situation. I think I am correct in saying that the people feel that the northern islands tend to have more of abundance of let's say crabs and birds, things of this sort. So, if a people were to go and eat a chicken or a bird (I guess that would be a bird) or a crab a day up there, is that a problem then if they did that? (So I ask, "A day, one day out of a month?" And he says, "No, each day.")

Ray: Do you want to try that one, Bill?

(Robison to Ray: No, because we are in a continuous living pattern. I don't know what to say about that...)

Ray: There is, I think not, a yes or no answer to the question. And, the portion of the diet that comes from the northern islands, as that portion increases, the radiation dose to that person increases. If all of the diet comes from the northern islands, that still is not a great catastrophe. But things can be better if none of it comes from the northern islands. So it is a matter of degree. And there are choices to make if there are benefits such as a better diet or a more delicious diet from going to the northern islands than confining to the southern islands. There is a choice that the individual must make or the community must make. Perhaps you would translate that and then come back to me.

(Buck to Ray: I have a question.)

(Ray to Buck: Okay, I wanted to continue there.)

Ray: In coming here, Senator, to present this report all of us have as you know, have flown an airplane from the mainland. And because of that flight we have been exposed to radiation much higher than we would have been, appreciably higher than we would have been had we stayed home. By being up at high altitudes we get more radiation than had we been on the ground at home. The amount of radiation that all of us received just coming here for this visit is not very different from the increase in radiation that your Rongelap person would have by your daily increase in diet from the northern islands over six weeks. Our one trip here might equate to a month or six weeks of this increase diet from Rongelap. We derive some benefit from that. It is important to us to be here so we accept that additional radiation, knowing that it is an additional risk to us, because there is something that needs to be done here or that we want to do, that we like to do. Similarly, if it is important enough to go to the northern islands and expand the diet, there is some additional risk, we believe the risk is small and the risk is described in this booklet. Nevertheless, we cannot say that there is no increased risk from eating food from the northern islands.

[redacted]

in our islands and you came to make this explanation to us and meet with us and we are grateful for your concern and willingness to accept that increased radiation as a result of the trip. I see a difference in your example, though, because this is something that by choice you have done and in a sense we're not sure what our choice is because we would rather have not had our islands contaminated in this way. And yet they are by people other than ourselves, by a choice that was not ours, and so we are faced with this condition. And so I'm just concerned now about our people and this choice is forced upon us. You did it of your own free will. But with us it is a forced choice now that we have to make, or situation we have to deal with. And I think that is a bit different but we understand your explanation.

Ray: Well, we too feel that it is most unfortunate that Rongelap was contaminated. That was not by our own free will, it was as a result of an accident. What we are talking about here is I think the choices that now exist and the Senator was asking, "Is it appropriate to tell people they must not go to the northern islands or is it appropriate to say they may, freely?" Well it is somewhere in between and there are..., that's the value judgment that I wanted to address.

Robison: The practice throughout the world in radiation protection is that even though 500 mrem is an acceptable level that governments work with, if there is any practical way to stay below that level even though they say that's a level you can, you know, go up to and around, if there is any practical way to stay below that, they do it. And what we are saying here

is that there is a practical way to reduce the exposure for the people at Rongelap by not using foods from the northern end. If you do use foods from the northern end, certainly there will be more radiation in the body and a slightly greater risk, be it small, however. But that definitely it will increase the levels in the body, but we are just saying that in the way radiation is handled worldwide, if you have a practical way to reduce it, the exposure, you will do it. And we are saying that this opportunity exists at Rongelap by simply not using the northern foods anymore than is really necessary.

Marshallese: On this paper, it states that the amount of radiation in any part of the body for Rongelap would be 2,500. Now that's a lot more than 500. Is there going to be some problem with that?

Robison: The 2,500 number shown here is the total amount over 30 years, not one year, and the comparable number for 30 years is 5000. So this is the total amount estimated for 30 years, not one. And the standard, the guideline for a 30 year exposure is 5000, and that represents the number estimate for Rongelap island.

Buck: Oh, Rongelap island?

Robison: Yes, Rongelap island.

Marshallese: It sounds like it is decreasing. You said that all of this is decreasing, so how did it reach, what 5000? 2500? How come it is 2500 if it is decreasing?

Ray: The amount per year is decreasing. But all of the years have to add up.

Robison: If it starts out, for example, let's say the first year is 450...

Buck: 30 times 400 is 12,000.

Robison: The number that would compare to the 500 that you referred to would be this column which says 400, but that is the maximum amount, the maximum exposed individual. Most people would get much less than that and that's the number you would compare to 500 and that gets a little less every year but by the time you add up 30 years that's how you get 2500. Okay? It is getting less every year but still you have to add year one, two, three, four, five, right up to thirty. And so that's how you get to that number at the end of 30 years.

Marshallese: Seems like yesterday, I remember now something I wanted to ask about our discussion yesterday. That at Rongelap, somebody living at the northern part of the atoll with the numbers you are using in your calculations as a base, 233 population in 1980, in the next 30 years, at some point in the discussion yesterday, I recall you saying that perhaps 3 might die. Die from cancer? I remember this coming out of the discussion when we were looking at the slides and the figures on the slides, seems to me that that figure came up 3 people.

TAPE 6, SIDE 2

(Note a few words were lost when the tape was turned over)

Robison: ...additional cancer. Bair's point six to 3.

Marshallese: Looks to me like the color in this picture of Rongelap island is just one down from the color of Naen. In other words we aren't in that category but we're in this category by living on the islands, the main island of Rongelap. He says that of everybody living at Naen you get the figure 3, might 3 more might die because of all of them living there. Well, Rongelap is the next spot over as far as contamination. So what's it for us?

Ray: And it is point six. It is one-fifth of that. Less than one or point six.

Bair: It is the number shown on the chart for Rongelap.

Marshallese: Point 6 means not, it doesn't even mean one person. It is less than one person for a 30 year period!

Ray and Bair: Right.

Marshallese: What about fish, sea life? Either ocean or lagoon at Rongelap? What about them? Is there any problem with that?

Robison: We have measured the sea life, the radionuclide concentrations in the sea life at all the lagoons and in the ocean at all the Northern Marshalls and we have found no place that we would recommend that you are not able to fish. The marine products, be it the lagoon or the ocean, have low levels of radioactivity in them. In fact we find that the radionuclide concentrations in the fish at the atolls here in the Marshalls are really about the same or less than what we see in fish in the United States, in the United Kingdom, Britain and Japan.

Marshallese: Shellfish. Like clams and crabs. What about these in the Rongelap islands?

Robison: The concentration...

Buck: He says fish obviously swim around and move. What about these things that are not as mobile?

Robison: The same thing is basically true of the clams, the big clams and the smaller variety and the lobster. They're very low level and there is...you know...

Marshallese: I just think that it would please me if you as experts in the field and the scientists who have studied all of these and are familiar with the significance, the way these things affect us, you, it seems to me

to have the authority to really be specific and say either, "don't use these foods from the northern part," or "yes, it is all right for you to use these things." We don't have that capability, that understanding of the situation, so it is hard for us to be, consider ourselves the authority on this. But you are, and so, that word, it seems to me, needs to come from you.

Ray: Well, we certainly could make a very positive statement that if you wish to keep your radiation dose as low as possible then, do not eat any foods from the northern islands. In just the same way we could say to you, if you wish to keep your risk of lung cancer to an absolute minimum do not buy or smoke any more cigarettes. Or we could say if you do not, we could say if you do not wish to die in an airplane crash do not again ride in an airplane. It has been our choice, instead of that, to try in the best way we know how, to describe to you the amount of risk that you take in making your own choice about radiation in your environment. We recognize that this is very difficult, it is difficult for us to explain, it is difficult for you to comprehend. But, we do not want to be rule makers, we do not want to be saying you may not or cannot do these things. We hope to continue to describe to you and explain to you how these risks relate to other things that you are accustomed to, and hope then that you can make your own judgements.

Marshallese: Before your 1978 survey, we were given a statement and it was perfectly clear and that was, "you shouldn't eat crabs from the northern islands in Rongelap." Now that is a clear statement, we understand that. Now it seems like your saying, "well, sure you can, if you choose, eat one a day or something like that." Is that a, am I hearing you clearly that that has now changed? What you are saying today is different than what you told us before the '78 survey?

Ray: I think we are trying to say it in a way that provides greater understanding rather than rules. Senator Balos said earlier that it would be better and easier if we would simply say do, or do not. If it is at all

[redacted]

and then they say, well that's inaccurate or that's certainly not so, they are misleading you or deceiving you. And so, that is why we are really puzzled. This makes for a lot of misunderstanding, so it is difficult now for us to really know what to do when we get that kind of information from different sources, so, I think that is one of the reasons why we are having these questions.

Ray: Well, if that's the case it seems to me that this is a very wholesome exchange and that we should and do encourage a discussion with those advisors, those council members, those experts. And, we have freely made available to any legitimate representatives or advisors of the people, all of the information that we have. We welcome their advice and you know in the case of the Bikini people we cooperated extensively with the counselors and advisors that they retained. And we stand, certainly, willing and ready, and these documents are available, as I said earlier this morning,

to be distributed to them so they can challenge and they can ask about them and, if they wish, go and make their own measurements to verify them. We have done the best, we have done in the best way we know how, a job of determining the conditions, analyzing their significance to man and presenting them. We are not infallible nor do we guard these, this information and these conclusions in any way. They are open, open public documents for anyone to challenge and to give us suggestions about.

Muller: I have a question now about the thyroid disorders and I recall seeing in some medical publication a figure that indicated that out of a population of 30,000 you would expect to find 2 thyroid conditions, I don't know if this means cancerous or whatever. This being the normal incidence of thyroid among a population of 30,000, given 30,000 people. Well, the 30,000 would certainly approximate the population of the Marshalls and yet we have had 500 such incidences. So what kind of explanation do you have for that?

Ray to Bair: Bill Bair, do you have any comment to make on that, or...

Buck: Oh, he says it is actually one out of 30,000.

Ray: He's speaking of, I believe, normal incidence of thyroid abnormalities in a population (per 30,000).

Bair: I have the information here, I think I can help.

Ray: Do you want to come back to that?

Bair: Yeh.

Ray: Dr. Bair thinks that he may have some information that he can look at right now. Let me suggest that we hold that question.

Ray: Could we go on to another and come back to Dr. Bair?

Marshallese: What I want to bring up, now, is sort of different from what we have been discussing, because that we now understand that this book was prepared with detailed information regarding the conditions for the 30-year period following the 1978 survey. And I have a feeling that people who are involved and live in that period are to be considered fortunate to have this document, now, that explains so much of what will be effective then. My concern or my question now really revolves around those that have been affected prior to that year, just what can be done for them? Is there any, I suppose compensation, is there any help, is there anything to tell them? Any information for them about their condition, because this book you say definitely is not addressed to them?

Ray: That is correct. Well, there are other publications that have come out from time to time ever since 1954 on the condition of and the consequences to those people. There are numerous publications on those subjects and the matter of their future and compensation has been a part of the negotiations between our two governments over the past many months. We are not prepared to really discuss that subject here. There are other forums where that is being discussed and we have no real authority to come and talk about it here. This visit has a different purpose.

Marshallese: I want to ask about Kwajalein and Rongrik (did he say?) and Kwajalein and Rongrik; what about the radioactivity that may be involved or incurred by the missiles that are being tested? Is there an increase (or is this, increase or decrease) increase in the radioactivity in those two places, Rongrik and Kwajalein, from the missile testing?

Ray: We are not even indirectly responsible for the missile activities at Kwajalein. Those are Department of Defense, Department of Army activities. But I am not aware of any radiation consequence of those missile launches. There are to the best of my knowledge no significant amounts of radioactive materials that are involved in those, in those missile launches.

Marshallese: Does that mean that all missiles that are shot into our lagoon at Kwajalein have no radioactive elements in them, products?

Ray: I cannot say that. I think that is true for at least, that if there is any radioactivity, it is minimal. It might be, my watch is radioactive, there might be some radioactivity in some components but there are no atomic warheads. There are no atomic bombs in those missiles. There are no atomic explosions having to do with those. And, I am quite, I am confident that there is no significant introduction of radioactivity into the Kwajalein lagoon from those but I, again, would say that the question should be addressed to the people that are doing it and if there is some further question about that I will be glad to carry that question back to the Army and see that it gets answered.

Marshallese: Oh, I felt this was an appropriate question to address to you because I felt that anything having to do with weaponry, this kind of thing, you would be familiar with. This is something that scientists manufacture or their knowledge goes into making these, these explosives and so forth. And so, I thought that you would know about this, and as I have observed, those that have entered the lagoon, there is quite an explosion involved. I mean there are rocks and stuff that go up into the air and I thought you would be informed about this and could answer my question.

Ray: Well, I'm personally am informed but in the same way that you are, from what appears in the press and from what we read in the paper, hear on the radio. And I would not like to be considered an authority on what the Army is doing there. I will say with a high confidence, that I'm absolutely certain that the Army is not sending atomic weapons into Kwajalein lagoon. What they are sending, I don't know. I don't know the composition of it, but if they were using atomic energy bombs, we would know it and we would be involved. Since they are not doing it, we are not knowledgeable and we are not involved.

Marshallese: Because of the discussion we had yesterday and the information that was presented, one of the elements named was plutonium. And, we would really like to know, is there any plutonium in the missiles that come into the Kwajalein lagoon? I really feel that we can now ask things that we want to know and feel comfortable, we want to build on this relationship of sharing information with each other. What we know we tell you, what you know you tell us. What we don't know we admit to that, on both sides. So I am really thankful for the opportunity to ask this of you and if you don't know the answer would you convey it where it should go, be our voice in asking? Is there any radioactive elements in the missiles that come into our lagoon that would be of harm to our fish or to the life in the lagoon at Kwajalein?

Ray: Again, I cannot answer with authority because I don't know what is in every missile that comes into the Kwajalein lagoon. I assure you that I will carry that question to the Army and arrange that it be answered as promptly as possible to the government of the Marshall Islands.

Marshallese: I want to own, ask something and I want to own up to the fact that I have no advanced degree. I am not a doctor and so all the explanations that are in the book I have something I want to ask with this understanding. In this publication, 8, 10 and 11, is all of this data given on these pages, does this come from the U.S.S. Wheeling survey?

Robison: Yes, everything presented in this booklet basically comes out of or does come out of the Wheeling survey.

Marshallese: Turtles and turtle eggs, regarding Mejit. So since this report definitely names some information regarding turtles and turtle eggs from Mejit, I don't recall seeing a single turtle or any turtle eggs being observed or gathered during the visit of the Wheeling so I am kind of wondering why there is information here attributed to that survey.

Robison: That's a good question. We wanted to be able to put an entire diet together to estimate the dose at every atoll. Now we weren't able to collect turtles or turtle eggs at every atoll, but the turtles we have been able to analyze throughout the Marshall Islands, all are very similar and all the other doses or all the other radionuclides concentrations we see at the outer atolls, Mejit, Wotho, Ailuk, Likiep are all just about the same. And, so what we did was take the average from the all the turtles we were able to analyze and use that at an atoll if we were unable to collect them at that specific atoll. But we see no difference between the turtles we have been able to analyze wherever we get them. But we weren't able to get them every place, but what we did was take the average value from what we've seen throughout the Marshalls and then we used that at every, at an atoll if we were unable to collect them just so we would have a complete diet and we didn't leave anything out.

Marshallese: Thank you.

deBrum: Then maybe we can assume that some day when a turtle comes over on Mejit to lay eggs, the people catch that turtle and eat it, they are likely to absorb the same amount of count as stated in the book.

Robison: Right.

Marshallese: He said that there seems to be great differences between the amounts of radionuclides in the different places but he says, look here in the book I see that the one at Likiep is a little bit different, has a little different specifications than the one that you gave to Mejit, and so he says that maybe that was a male.

Robison: Maybe that, what?

Buck: A male.

Robison: Maybe that is so. I would have to look back at my specific data to tell for sure. Which of course I don't have with me. But basically what happened is if that if we had a turtle from an area and measured it we used that number. Now, that number varies very little but at another atoll it would be just a little bit different but very close; and so what we did was we averaged all that and would apply that to an atoll where we had nothing and, therefore, they don't always look exactly alike, but they are very, very similar no matter where you find them.

Buck: I just happened to notice that down the line it seems like Mejit ranks a little higher in all of those figures than Likiep. Likiep is a little higher than Mejit.

Robison: I think just an addition on the turtle question, we have sampled enough turtles from around the area we feel we know basically what the concentration is in a turtle and it is very, very low and there is no problem. And we just don't like to keep taking turtle samples because there aren't that many. We don't collect them just to go back and measure them when we feel we know already that the concentration is very low and there is no problem with the turtle.

Ray: I'd like to clarify one thing, to make sure I heard it correctly. Did someone suggest that male turtles are laying eggs too?

(Laughter! Only Roosters!)

deBrum: Please correct that. It's an Ailuk rooster, not a turtle! Any chance, because of the radiation problem? (more laughter)

Ray: Yes, Dr. Bair is ready with the information. It was Phil's question.

Bair: In 30,000 people you would expect normally about 6 people to have thyroid cancer. I don't remember what number you said. One? It is really about 6. But it is true in the Marshallese, in the 239 Marshallese who

[redacted]

Muller: Well, I have not conducted any vast research in this subject so it's not because of my interest or lack of interest that these figures seem to be this way, but thank you for your reply.

Marshallese: I just want to further observe that on this sheet, the amount

[redacted]

listed for Rongelap as 400, for Mejit 100. Both of those are higher than the figure given for Utrik, and yet with that low figure we have had nine operations in that one year. Now I just want to make that observation as a matter of deep concern for me and my people. And what, now, can we expect in the next 30 years, that was one year?

[redacted]

and hypertension among the women. All of these have had an upsurge and so we are just wondering we really are puzzled by this and would like to have that addressed as to what has been the possible cause, what contributes to this increase which is verifiable?

Ray: I assure you that we, as you know we have recorded these questions and I have recorded some, we will certainly take these back to the appropriate people to the extent that it is appropriate for the United States government to look into these things we will. I think that it must be something that will be discussed with the health authorities of the Republic of the Marshalls, to the extent that our doctors have any information that might shed light on it, certainly that information will be available. And we will endeavor in cooperation with the government to look into these things and help find some answers.

Buck: Thank you.

Marshallese: A benign thyroid condition develops from what, or a cancer, malignant thyroid develops from what. What makes the difference between these two kinds of tumors that develop in the thyroid? I would like to know.

Bair: I don't know.

Ray: That's again a physician's question and we are not prepared or qualified to answer.

Ray: Mr. Secretary.

deBrum: It is now 3:45. Would you like to have a 5 minute break and then conclude it?

Bair: Let's conclude it now.

Ray: We can do that or we can conclude now.

deBrum: (not clear)

Ray: I think we would rather conclude it now.

deBrum: There is one maybe last question.

Ray: Yes.

Marshallese: I'm not sure if this has already been discussed in my absence because I haven't attended all of these sessions; nevertheless, I would like to just ask for my own clarification. According to the report in the book as written and presented to us, it seems to me that it is clear that from the tests conducted at Enewetak and Bikini there has been contamination to the atolls that are, were surveyed, some more than others. Is that correct?

Ray: That is correct.

Marshallese: So, for further clarification, the radioactive, the radionuclides from the tests that now are in the soil and also become then part of the plant life and even the land life, pigs and chickens and birds. They have these now in them, there has been an intake of this until present, in the soils and in the life, plant life and animal life. Is that correct?

Ray: That is correct.

Marshallese: Now in some atolls where there is higher radioactive present, the people living there will ingest or have some of that in their bodies. That will be higher than other atolls where it is smaller, like Likiep and Mejit and some of those. Nevertheless, people living there, as they live there, they will continually be absorbing or taking in these radionuclides. Is that correct?

Ray: That is correct.

Marshallese: I just wanted to ask this for my own clarification.

Ray: And, all three of the statements are correct. But I would like to emphasize as is shown in the booklet, that for most of these places those numbers are very, very small and that the radioactive dose, because of that, is comparable to radioactive, radiation dose that people experience in lots of other places, lots of other conditions in the world.

Marshallese: If there had not been tests conducted in the Marshalls, then these levels would even be lower than this. Even though you say they are low, nevertheless, they are higher than they would have been or were prior to the testing of the atomic weapons?

Ray: Yes, certainly that's true.

Marshallese: It seems to me yesterday the request was made that Wotji be surveyed; and if indeed there is going to be a survey of Wotji, I would request that Taongi further north. The people of Utrik are interested in that atoll for purposes of planting and increasing our food supply as our population increases. So it is of concern to us what the radioactivity of that atoll is and I would suggest that if there is additional surveys conducted for Wotji as requested yesterday then I would like that atoll also surveyed.

Ray: Let me clarify. I believe that the request that was made yesterday and the offer that I made, was that we would research those things that have been done at Wotje already. but were done back in the earlier years, and if we were to produce that information and reduce it to a meaningful document for the people of Wotje, we would let them know what is done and what, on what basis we feel confident that Wotje does not need a further survey.

Marshallese: Well, if you do that for Wotje can you do that for ? ?

Ray: Yes, we can certainly. We will do that.

Marshallese: Second question I have. This picture, the illustration on page 22, very clearly points out that it's not just the thyroid that is affected by radionuclides but they enter the bloodstream and are then carried to every part of the body, so that my friend here from Rongelap joins me in requesting that after this don't just bring a thyroid specialist but we would appreciate a doctor that is a specialist in the other areas of the body since the whole body is affected. An eye doctor, an ear doctor, a brain doctor, a physician that would be able to give us help with other ailments that we might have since our whole body is affected, not just our thyroid.

Ray: The doctors who participate in the DOE program represent a wide range of abilities and experience. The emphasis for some years has been on thyroid because that has been the most evident result, but we have had specialists in all fields visit and some generally qualified practitioners who are capable of recognizing the need for other specialists to come in. We certainly, in the DOE medical program, certainly does not look only at thyroid. It has done work in all sorts of illnesses but concentrating on those things that by experience and knowledge are most closely related to radiation exposure. We have had some cardiologists, we have had some diabetes studies, we have had parasitologists working with parasites, pediatric specialists, even dentists helping in that program.

Marshallese: We from Rongelap and Utrik have this request and now the Senator from Enewetak also joins in requesting that those of our number who have had thyroid operations, some were not exposed to the fallout, and so consequently received no compensation yet they as a result of their operation are required to take medicine daily perhaps for the rest of their lives. Is there some way to financially help these people since they are now required as a result of their operation for this sickness that they have?

deBrum: If you cannot answer this perhaps you can take this request to the proper authorities?

Ray: I shall do that. I want to comment that the matter of treatment of illness and injury that is not radiation related is a subject of agreements between our government and the government of the Marshall Islands and the subject of continuing discussion. And I shall certainly take that subject to those discussions.

Marshallese: I have no further questions.

deBrum: On behalf of the President who is not here or the Acting President, I want to express our extreme gratitude and sincere thanks for the team's coming, presenting us with this information from the study made and your report at this time to this group. I am especially grateful for this kind of setting where we are able to sit down face to face, discuss these matters, raise questions and get answers or at least have them raised so the answers can be forthcoming, eventually in the future. We are encouraged by such a gathering and are grateful to have had this. I might just say as sort of an example or a parable that as we sit here it is almost as if a ball of fire had fallen right in the middle of the room and we are trying to find out how we can escape injury from getting too close to that fire, and in that way we want to avoid injury. And those that have been burned, we want to discover, try to find ways of giving aid in their distress and discomfort or illness or harm. That is figuratively how I

experience our meeting these past two days. So provision has been made now for this in the agreement or the proposed 177 that the two governments are discussing and we are glad to know that they will be pursuing this matter. I was very encouraged to hear you say that you welcome the people taking these reports and sharing them, showing them to whoever they wish to seek further advice and counsel. I think that that is a healthy situation and we can all grow and benefit. And I would hope that any further research or results or information, whether pro or con, would also be brought and we would be able to further discuss, so that we would all better understand what's involved.

deBrum: I'll give everyone an opportunity to say a few words.

Marshallese: I am very grateful for having been here and for the report that you brought and explained in great detail. I feel better equipped to share as much as I have gained from it with my people. And I thank you for enabling me to do this by providing this kind of information. This is a help to me and my people and I thank you most sincerely.

deBrum: Do you want to say a few words?

Ray: Well, thank you Mr. Chief Secretary and thank all of you. We again appreciate this opportunity and your hospitality and especially the time that you have taken to come and very patiently listen to us and absorb what we have been able to pass to you on a very difficult subject. We want to continue this discussion, this exchange so long as you find it useful and we welcome your suggestions about questions that still need to be answered about things you would like to hear more from us about. We have taken a number of notes on those and I assure you that they will receive our attention. I know that I speak for my associates here when I say we have been pleased and greatly impressed. We respect greatly the efforts that you have made and the degree to which you have absorbed so much information in such a short time. Your questions and your comments will make us very much better prepared to visit your communities at a later date.

[redacted]

appreciation to Alice. Thank you.

* Reverend Elden Buck, Alice's husband.

Use everywhere appropriate & Use brackets

3 Use Suzanne or last name spelled for first time.
It is OK when Oscar & Roger used it in the conversation - but the spelling is Suzanne I think

4 Oscar deBrum or Debrum? Check the list of names, I think the first is correct. (← I think) Again - use full name first time & last name thereafter

5 Phillip Muller - follow same procedure.

6 It is already long so don't worry about crowding the pages. (Page 1 was worst one.) A few extra pages doesn't matter.

7 I noted a lot of "yeh's" on the tape. I think I marked them as "yea". "Yeh" is probably correct. There should be no yea's. Can you program your machine to remove them?

8 Roger used a lot of 'ands' in his speaking. At first I isolated them with parentheses, but I may have gotten careless. It is probably just as well to continue the practice throughout. (I think I found all of them)

Conversations among the participants should be in parentheses, This means they were not translated into Marshallese.

DOE MEETING 12/8/82 MAJURO

Sen. Ishmael John	-	Enewetak
Sen. Calep Rantak	-	Ujae
Sen. Ataji Bal[illegible]	-	Kwajalein
Sen. Donald Mattnew	-	Utirik
Minister Jeton Anjain	-	Rongelap
Minister Tom Kijiner	-	Likiep
Sen. Tokwa Tomeing	-	Wotje
Sen. Katip Mack	-	Arno
Mayor Jabwe Jorju	-	Rongelap
Mayor Nechield Leem	-	Ailuk
Mayor Elden Juda	-	Utrik
Sen. Report Emmius	-	Mejit
Mayor Aneo Keju	-	Mejit
Sen. Mwejor Mathusala	-	Wotho
Oscar deBrum	-	RepMar
Phil Muller	-	RepMar
Suzanne Cowan	-	RepMar

DOE:

Roger Ray
Dr. William Robison
Tom McCraw
Harry Brown
Dr. William Bair
Mrs. Alice Buck
Reynold deBrum

Conversations + discussion among the English speaking participants that were not translated are given in parentheses.

TRANSCRIPTION OF MEETING BETWEEN DOE REPRESENTATIVE AND GOVERNMENT OFFICIALS OF THE REPUBLIC OF THE MARSHALL ISLANDS AT MAJURO

DECEMBER 8 AND 9, 1982

The purpose of the meeting was to present to and discuss with the government officials of the Republic of the Marshall Islands, two publications: "The Meaning of Radiation for Those Atolls in the Northern Part of the Marshall Islands That Were Surveyed in 1978" and "The Northern Marshall Islands Radiological Survey: Terrestrial Food Chain and Total Doses." This printed version is hand list

The following is an unedited verbatim transcription of the English language portion of a recording made of the two-day meeting. Since it was not possible to identify with certainty all of the Marshallese speakers, they are identified in most cases as "Marshallese." From their translated comments it is frequently possible to identify the atoll they represent and for ~~in~~ many of these it might be possible to identify the speaker. The translator, Mrs. Alice Buck, is identified in the transcript as the speaker only when she spoke for herself. A few words are left blank in the transcript because they were not recognizable to us. The addition of these and the identity of some of the Marshallese speakers would improve the transcript, if they can be supplied to us. ~~In addition to this transcript, copies of the tapes are available.~~

~~The transcript does not reflect the humor.~~

W. J. Bair
Feb 1983

~~The insertion of punctuation is somewhat arbitrary.~~ In the transcript

Because it was not always clear on the tapes where sentences + phrases began & ended, much of the punctuation was inserted arbitrarily.

The transcript does not fully reflect the friendly, yet serious atmosphere in which the meeting occured. The frequent instances of humor ~~and~~ and laughter are recognizable on the tapes, copies of which are being made available

[redacted]

Marshall Islands That Were Surveyed in 1978" of/

"The Northern Marshall Islands Radiological Survey:

Terrestrial Food Chain & Total Dose"

The following is an unedited verbatim transcription of the

~~of a recording made of the~~ English language portion of

of the recording made of the two day meeting. Since

~~was~~ it was not possible to identify with certainty all of the Marshallese speakers,

they are identified in most cases as "Marshallese". From their translated

comments it is frequently possible to identify ~~them~~ their detail

they represent and in many of these it might be possible to identify the ~~[redacted]~~

speaker. The translator, Mrs Alice Beck, is identified in the transcript

as the speaker only when she spoke for herself.

A few words are left blank in the transcript because they were not recognizable to us. The addition of these and the identity of some of the Marshallese speakers would improve the transcript, if they can be supplied to us. In addition to this transcript Copies of the tapes are available.

W J Bair

REPOSITORY PNNL

COLLECTION Marshall Islands

BOX No. 56 88

FOLDER Marshall Islands Oct - Dec 1982

DOCUMENT **DOES NOT** CONTAIN ECI

Reviewed by DJ Krupka Date 4/20/97