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UNITED STATES ATOMIC ENERGY COMMISSION

Regulatory File Cy.

IN THE MATTER OF:

TOLEDO EDISON COMPANY
and
THE CLEVELAND ELECTRIC
ILLUMINATING COMPANY

Docket No. 50-346

(Davis-Besse Nuclear Power
Station, Unit No. 1)

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Place - Port Clinton, Ohio

Date - 29 January 1971

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UNITED STATES OF AMERICA

ATOMIC ENERGY COMMISSION

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 and : Docket No. 50-346
 THE CLEVELAND ELECTRIC :
 ILLUMINATING COMPANY :

(Davis-Besse Nuclear Power :
 Station, Unit No. 1) :

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Ohio National Guard Armory,
 135 W. Perry Street,
 Port Clinton, Ohio

Friday, 29 January 1971

The above-entitled matter came on for further
 hearing, pursuant to notice, at 9:00 a.m.

BEFORE:

WALTER E. SKALLERUP, JR., Esq., Chairman,
 Atomic Safety and Licensing Board.

DR. CHARLES E. WINTERS, Member.

DR. WALTER H. JORDAN, Member.

APPEARANCES:

(As heretofore noted.)

ALSO PRESENT:

JAMES L. KNIGHT, Esq.

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C O N T E N T S

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<u>WITNESSES:</u>	<u>DIRECT</u>	<u>CROSS</u>	<u>REDIRECT</u>	<u>RECROSS</u>
Dr. Arthur Tamplin	1499	1524		
Carl W. Houston	1567			

<u>EXHIBITS:</u>	<u>FOR IDENTIFICATION</u>	<u>IN EVIDENCE</u>
None.		

P R O C E E D I N G S

1
2 CHAIRMAN SKALLERUP: The hearing will come to
3 order.

4 Mrs. Bleicher yesterday asked for the opportunity
5 of waiting until today to complete the cross-examination of the
6 Applicant's witnesses.

7 Are you prepared to proceed?

8 MRS. BLEICHER: Mr. Chairman, I conferred with
9 my client, Dr. Oster, last night. Dr. Oster is giving a
10 preliminary examination at Bowling Green this morning for a
11 doctoral candidate and will not be here.

12 Therefore, we rest in our cross-examination. We
13 have no further cross-examination.

14 CHAIRMAN SKALLERUP: The Board is prepared to hear
15 Dr. Tamplin. Is Dr. Tamplin present?

16 MR. ENGELHARDT: Dr. Tamplin is here -- that is,
17 he is here in Port Clinton. I have discussed with Mr. Lau's
18 previous counsel, Mr. James Knight, who was with Dr. Tamplin
19 this morning when I spoke with them, and I informed them that
20 the proceeding was to begin at nine o'clock this morning and
21 they told me they would be here at nine o'clock. But they
22 are not here at the moment.

23 CHAIRMAN SKALLERUP: Mrs. Bleicher, have you any
24 witnesses that you are prepared to call?

25 MRS. BLEICHER: We do have one witness coming in

1 from Bowling Green this afternoon, and we were in communication
2 with Mr. Lau's attorney, or former attorney, Mr. Knight, last
3 evening. And he informed us that Dr. Tamplin would be here
4 for Mr. Lau today.

5 The other direct witness that we had prepared for
6 today in case Dr. Tamplin didn't arrive, is ill today and is not
7 going to be here.

8 We would like to move the Board that if Dr. Tamplin
9 does arrive, LIFE be permitted to also call him as a witness
10 for LIFE, to testify as to matters concerning LIFE's contentions
11 on a separate basis from appearing for Mr. Lau.

12 CHAIRMAN SKALLERUP: Do you have a comment, Mr.
13 Charnoff?

14 MR. CHARNOFF: Some time back this Board ordered
15 that the parties were to notify -- were to be notified by LIFE
16 or Mr. Lau who their witnesses were to be by the 20th, I think
17 it was, of this month. Dr. Tamplin's name was not on the
18 list offered by LIFE, and therefore we would object to Dr.
19 Tamplin's being made available as a witness by LIFE.

20 Secondly, I notice Miss Vicki Evans is here. She
21 is one of the witnesses offered by LIFE, and I would think
22 Miss Evans could proceed.

23 Thirdly, we did discuss yesterday the fact that
24 there was always the contingency that time would be available
25 and that LIFE was to have witnesses present for today. That

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1 being the case, if LIFE has no witness present that they
2 ought to forfeit something.

3 MR. ENGELHARDT: Mr. Chairman, with respect to the
4 motion of LIFE's, if we are ever going to have any order in
5 this proceeding, I think we are going to have to make some
6 hard and fast rules, and make them stick now. This Board
7 has been overly generous in providing the Intervenor with
8 opportunity to perfect its case.

9 I think we have here in this motion an effort to
10 again break the agreements that we have reached, and the
11 Board has ordered, and I think now is the time for us to
12 comply firmly and strictly with the Board's decision with
13 regard to the scope of the testimony.

14 Therefore, we would oppose the granting of that
15 motion.

16 CHAIRMAN SKALLERUP: The Board will go off the
17 record.

18 (Discussion off the record.)

19 end #1

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CHAIRMAN SKALLERUP: Mrs. Bleicher, before ruling on your motion the Board would like to recognize Mr. Knight.

Mr. Knight, do you care to make an appeal on behalf of Mr. Lau?

MR. KNIGHT: Yes, Mr. Scallerup.

I would like to enter my appearance or reappearance, as the case may be, on behalf of Mr. Lau and announce to the Board that Dr. Arthur Tamplin is present with me this morning, hopefully for the purpose of having your permission to testify before the Board. And I understand the motion has been made on behalf of the Bowling Green Group that he might also testify to their behalf, and I would only add that we certainly agree with that and concur with that and urge the Board to grant that permission.

CHAIRMAN SKALLERUP: The Board would appreciate the opportunity of conferring with counsel.

(Discussion off the record.)

END#2

1 CHAIRMAN SKALLERUP: The hearing will come to order.
2 We have just had a conference at which we discussed
3 LIFL's motion to make Dr. Tamplin its witness.

4 We discussed the contention of Mr. Glenn Lau
5 and Mr. Knight informed us that he proposed testimony of Dr.
6 Tamplin.

7 Inasmuch as it appears that Dr. Tamplin's testimony
8 would be directed more towards the Part 20 standards of the
9 Commission than it would be towards Mr. Lau's contention,
10 and would therefore be subject to objection, the Board,
11 knowing Dr. Tamplin's reputation and wanting to hear what Dr.
12 Tamplin has to say, has determined to call Dr. Tamplin as its
13 witness.

14 Dr. Tamplin will be available for cross-examination
15 by any party in the proceeding. In this respect, Mr.
16 Charnoff, did you have a comment with respect to cross-
17 examination or Dr. Tamplin being able to return for additional
18 cross-examination?

19 MR. CHARNOFF: Yes, sir, I indicated that we would
20 possibly be prepared to cross-examine Dr. TAMplin today but we
21 may not, not having heard what he has to say.

22 On that basis we have no objection, obviously,
23 to the Board calling any witness as its own witness. We do
24 think that a fair opportunity has to be provided for
25 cross-examination and therefore our non-objection, if you will,

1 to the calling of Dr. Tamplin is on the condition and if we are
2 not prepared to proceed with cross-examination today, that Dr.
3 Tamplin be made available for cross-examination at the next phase
4 of the hearing.

5 CHAIRMAN SKALLERUP: Well, the Board would be willing
6 to do that. Of course we have to make such arrangements subject
7 to Dr. Tamplin's own convenience as well, so that it may not
8 be immediately at the beginning of the next session of the
9 Board. We will arrange that with Dr. Tamplin.

10 MR. CHARNOFF: Well, unlike the other parties to
11 this hearing, the Board does not have a prior obligation of
12 telling us which witnesses it would be calling. So we will
13 not comment further.

14 CHAIRMAN SKALLERUP: Mr. Knight, is Dr. Tamplin
15 prepared to speak at this time?

16 MR. KNIGHT: May I have a moment?

17 CHAIRMAN SKALLERUP: Yes.

18 (Counsel confers with witness.)

19 MR. KNIGHT: Mr. Chairman, Dr. Tamplin indicates he
20 is ready to proceed and he is willing to testify at the
21 Chair's pleasure.

22 CHAIRMAN SKALLERUP: Dr. Tamplin, before we begin,
23 there is the requirement that witnesses be sworn.
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1 Whereupon,

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DR. ARTHUR TAMPLIN

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was called as a witness on behalf of Intervenor Glenn Lau and,

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having been firstly duly sworn, was examined and testified as

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follows.

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DIRECT EXAMINATION

7

CHAIRMAN SKALLERUP: Proceed, please.

8

THE WITNESS: Is this microphone working?

9

CHAIRMAN SKALLERUP: You have to hold it close to

10

your mouth.

11

Would you please identify yourself and provide

12

us with your curriculum vitae?

13

THE WITNESS: My name is Arthur R. Tamplin. I

14

live at 5802 Greenridge Road, Haskell Valley, California.

15

I received a bachelor's degree in biochemistry from

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the University of California, at Berkeley. I also received

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a Ph.D. in biophysics from the University of California at

18

Berkeley.

19

In 1959 I joined the Rand Corporation in Santa

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Monica, California and I spent the next four years there

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working on various problems associated with the national defense.

22

In particular I worked in the area of bacteriological and

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chemical warfare. I also had some activities there associated

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with the space program in oxygen regeneration in space capsules

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and in the effect of cosmic rays on men in space flight.

1 In 1963 I joined the staff of the Lawrence Radiation
2 Laboratory in Livermore, California along with John Gofman
3 and a couple of other individuals. We were asked by the AEC
4 to establish a new division at the Laboratory, the mission
5 of the division was to gain comprehensive understanding of the
6 implications of the Atomic Energy Commission's activities on
7 the biosphere on man.

8 My particular task that I undertook within the
9 biomedical division was that of developing a practical state of
10 the art ability to determine the distribution of radionuclides
11 within the biosphere subsequent to their release as resulting
12 from nuclear activities, to determine the concentration of
13 the radionuclides in the various members of the food chain and
14 distribution and dosage to man as a result of these releases
15 and finding then the effects of this dosage upon man.

16 As of this time we have developed this practical
17 state of the art ability to determine the distribution within
18 the biosphere and the dosage to man and also what we consider
19 an up to date estimate of the biological consequences of this
20 exposure.

21 Should I proceed, then?

22 CHAIRMAN SKALLERUP: Yes, please.

23 THE WITNESS: Now, basically what I will present
24 here is the same testimony which I will be giving some time
25 in the future before the hearing in Long Island on Shoreham

1 Nuclear Power Plant No. 1.

2 I have been asked to appear at that hearing by
3 Mr. Turner of the Ralph Nader group. So this is essentially
4 a preview of the testimony that I will present there.

5 Basically, the nature of my testimony is concerned
6 with the regulations, that is, the primary standards, that
7 set the allowable radiation exposure to the population outside
8 of the restricted area of the plant and also with the secondary
9 regulations, that is, the set of permissible concentration of
10 radionuclides in air and water that can be released outside
11 of the restricted area of the plant.

12 Now, with respect to the primary standards, I am
13 going to essentially restrict the nature of my testimony to
14 the publications of the International Commission on Radiological
15 Protection. These will be essentially ICRP publication 8
16 and ICRP publication 14.

17 Now my colleague John Gofman and I have reviewed
18 essentially the same data that was reviewed by the International
19 Commission in publication 14 and we have reported on our find-
20 ings prior to the publication of ICRP-14.

21 CHAIRMAN SKALLERUP: Dr. Tamplin, will you hold it
22 just a moment, please?

23 THE WITNESS: Yes.

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End #4

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1 DR. JORDAN: The Chairman had some concern as to
2 whether the ICRP publications have a direct bearing on the
3 Part 20 of the AEC Regulations, and I believe, Dr. Tamplin,
4 that the Part 20 Regulations are to be based on the ICRP, so
5 there is a direct bearing; would you say that?

6 THE WITNESS: Yes. In other words, the Commission
7 in defending their present standards always indicate that they
8 rely upon the expertise of the International Commission in the
9 standards which they adopt. As a matter of fact, in criticizing
10 our initial presentations, the Atomic Energy Commission Staff
11 used a quotation from ICRP publication 14 in that criticism.

12 The Federal Radiation Council, which isn't in exist-
13 ence now, also always indicated that they followed substantially
14 the guidance of the International Commission on Radiological
15 Protection.

16 Well, the story concerning publications of ICRP,
17 ICRP Publication Number 14 and ICRP Publication 9, is quite
18 simple.

19 In ICRP Publication 9, which was put out by the
20 International Commission in 1966, with respect to the somatic
21 effects of the cancer-producing potential of radiation, they
22 indicated in ICRP Publication 9 that one rad of radiation
23 delivered to a million people would product some 20 cases of
24 leukemia throughout the lifetime of those people. Moreover,
25 they indicated that there would be an equal number of cancers

1 produced in all other sites of the body.

2 So that one would, from this one rad of radiation,
3 produce 20 leukemias and 20 cancers of all other forms.

4 Now, in 1969 when ICRP Publication 14 was produced,
5 the following-up studies on many of the groups of individuals
6 who had been irradiated, this is now some short three years
7 later, in ICRP Publication Number 14 they now indicate that
8 on the basis of the data that is presently available, they
9 would expect some six times as many cancers in the other sites
10 as they said they would have expected in ICRP Publication 9.

11 Moreover, in interpreting that further, in Appendix
12 4 of ICRP Publication 14, they indicate that because they are
13 now seeing more cancers in other sites, some 6 times more than
14 they anticipated, that the present standards for whole body
15 exposure is high by a factor of 10.

16 Moreover, in ICRP Publication 14 they indicate that
17 they would expect, as the people in the various studies
18 acknowledge, that the number of cancers which will be found
19 in the other sites will increase above the six-fold difference
20 that they now see. They estimate it might go up to something
21 like ten.

22 Now, Goffman and I would suggest it would get to
23 be as large as 20.

24 But basically, that is the story, gentlemen, on
25 the present guidelines for exposure of the population. The

1 guidelines were promulgated at a time when they thought only
2 an equal number of cancers to other sites would be produced as
3 leukemia. The substantive data is indicating there will be
4 probably as many as ten times as many cancers produced in other
5 sites, and the logic says, therefore, that the present guide-
6 line is too high by at least a factor of 10.

7 Now, there is one other aspect of the exposure
8 to the population, and that is the genetic effects of radiation.
9 All one can say in reading anything that was ever done with
10 respect to establishing the allowable exposure of the popula-
11 tion with respect to genetics is that the number that was
12 selected was picked out of thin air. There was never any basis
13 whatsoever for picking that number, and, as a matter of fact,
14 if we read ICRP Publication 9, we see that they specifically
15 state that in the official documents of the International
16 Commission.

17 If I could read from page 14 of ICRP Publication
18 9, this is paragraph 83 on page 14, the ICRP states:

19 "Because of the need for guidance in this regard,
20 the Commission in its 1958 recommendations suggested
21 that a provisional limit of 5 rems per generation for
22 the genetic dose to the whole population from all
23 sources, additional to natural background radiation
24 and to medical exposure."

25 This, I think one must recognize is the crux of

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1 most of the recommendations, and most of the guidelines that
2 we see governing the nuclear industry.

3 The Commission goes on to state:

4 "The Commission believes that this level provides
5 reasonable latitude for the expansion of atomic energy
6 programs in the foreseeable future."

7 The major reason for setting the standards was to
8 allow a reasonable latitude for the development of atomic
9 energy. It had very little to do with public health.

10 They go on to say:

11 "It should be emphasized the limit does not in
12 fact represent a proper balance between possible harm
13 and probably benefit. . ."

14 They don't even admit the harm or the benefit is
15 real

16 ". . . because of the uncertainties of assessing the
17 risk and the benefits that would justify the exposure."

18 So that is basically the story relative to the
19 genetic effects of radiation. We know that the radiation will
20 be harmful; we don't know how harmful it will be. We have a
21 standard; the primary purpose of it was to allow a reasonable
22 latitude for the expansion of the nuclear industry. It has
23 very little to do with public health.

24 Now, if I may just go, then, to the secondary
25 standards for the maximum permissible concentrations that are

1 reported in Title 10, Chapter 20, the secondary standards are
2 essentially set up so that an individual, if he is exposed
3 with either a release through air or water, that an individual
4 will get a 500 millirem dose, which is stated in the 10 CFR
5 end 5 20.

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1 In the normal day-to-day operations of nuclear
2 power plants, these plants are permitted by law to release
3 radioactivity in the form of various items into the environ-
4 ment, gaseous and liquid discharges. There are essentially two
5 regulations concerned with these releases.

6 The first one is Primary Standards, and the
7 second one is Maximum Permissible Concentrations in Air and
8 Water. Now, one should be derivable from the other, but the
9 secondary standards, the Maximum Permissible Concentrations,
10 which are listed in Title 10 of the Code of Federal Regulations
11 does not permit this because they do not take into account
12 the biological concentrating mechanisms that actually take
13 place in the environment between the release of the radio-
14 activity by the plant and the eventual consumption of contami-
15 nated foods by man.

16 Of course, this is the activity which the group that
17 I was in charge of was engaging in for the past seven years,
18 the ability to develop this practicability to determine the
19 eventual concentrations in man subsequent to release.

20 If we look at the Code of Federal Regulations, Title
21 10, page 133 to 144, we find that the Table of MPC's, this
22 is the various radionuclides in the air and water. The value
23 there in 137 is 2×10^{-9} microcuries per milliliter of air, and
24 2×10^{-5} microcuries per milliliter for water.

25 These are set for the whole body dosage, 500 millirems

1 per year would result from breathing such air for one year and
2 drinking two liters of water per day.

3 CHAIRMAN SKALLEPUP: There are two sets of tables
4 there.

5 WITNESS TAMPLIN: The one I am referring to is the
6 500 millirem which is Column B, which applies outside of
7 the restricted area.

8 Let us examine what such levels really mean in
9 terms of what could occur as a consequence of such levels
10 released to an unrestricted area:

11 If you look first at cesium-137 concentrations in
12 air, we find this material will deposit out on pasture plants,
13 for example. This will be eaten by cows and secreted in their
14 milk, and the milk will be subsequently consumed by children.

15 If the cesium-137 concentrations in air were main-
16 tained at the MPC for just one day over such a pasture plant,
17 the child consuming one liter of milk per day would get a
18 whole body dosage of 7 rads as a consequence of just that one
19 day's deposition.

20 If the MPC in air were maintained for one year,
21 which is really allowed by the standards, the dose would be
22 between 2,500 rads -- it would be 2,500 rads -- 5,000 times
23 higher than the 50 millirem guideline.

24 Now, if we look at the exposure to the population
25 at large where you are supposed to divide the 500 millirem

1 guideline by three to get 170 millirems, this is a 15,000 times
2 higher figure. So quite obviously the cesium 137 MPC in air
3 has very little relevance when you move out into what can occur
4 in the real world.

5 But when we look at the concentration in water of
6 cesium-137 that is allowed and the MPC is based upon the calcu-
7 lation of a 150-pound standard man consuming 2,200 grams of
8 water at the MPC per day; if he did that he would receive
9 500 millirems per year.

10 Now, one can look at it in just a simple way and
11 say to begin with a 75-pound child drinking the same amount of
12 water would be getting 1,000 millirems. He would be exceeding
13 the guideline by a factor of two.

14 Also, a 100-pound pregnant woman drinking the same
15 amount of water would be exceeding that particular guideline.

16 Man, woman, and child has also been known to eat
17 fish. The concentration of cesium in fish flesh caught in
18 the river at MPC would be 100 times higher than concentrations
19 in the water. Thus, a man eating one pound of fish a year
20 grown in water at the MPC would be receiving a dosage of 15
21 rads per year. That is some 30 times the AEC guidelines, and
22 90 times this 170 millirem guideline.

23 If this were a 75-pound child eating that much fish,
24 he would be exceeding the guidelines by some 60 times. In
25 other words, most people would exceed the guideline if they

1 ate only one pound of fish per year from water that was at the
2 MPC for cesium 137.

3 The milk and fish represent biological concentrating
4 mechanisms and they by themselves serve to demonstrate con-
5 clusively that using air and water and MPC values without
6 consideration of food chains, is really meaningless.

7 Let's look at another example. Let's look at a
8 straight physical process:

9 If the cesium-137 MPC in air were maintained for
10 one year, the resultant deposition on the ground would be 300
11 microcuries per meter square. Since some 13 microcuries per
12 meter square is equivalent to external radiation dose rate
13 of one rad per year, the radiation level from these 300
14 microcuries per meter square would be 23 rads per year.

15 Of course, this would hang around for many years
16 afterward.

17 In other words, even if air concentrations were
18 one-hundredfold less than the MPC, the open field gamma dose
19 rate levels would exceed the MPC guidelines.

20 So it doesn't matter what way you look at it. The
21 MPC's have very little relevance when one tries to translate
22 them into the real world.

1 It is often stated that reactor discharges are
2 kept to a small fraction of the MPC. I think this analysis
3 here would suggest they should be kept to a very small
4 fraction of the MPC. What is truly needed in order to properly
5 regulate nuclear power industry is a comprehensive analysis
6 that takes into account both the physical and biological con-
7 centrating mechanisms and is based on quantitative data on
8 each radionuclide in the whole industry that is anticipated for
9 the future in each ecological region of the nation.

10 Using the approach we have developed or some similar
11 approach this could be done and should be done.

12 I think it is important for the engineers in this
13 industry to have a meaningful set of design criteria that
14 will hold up if we are going to go ahead and build these
15 reactors.

16 That is basically the nature of the testimony which
17 I want to present.

18 CHAIRMAN SKALLERUP: Thank you.

19 How much time will Applicant and Staff require to
20 prepare for cross-examination?

21 MR. CHARNOFF: May I make a suggestion, Mr. Chairman?

22 CHAIRMAN SKALLERUP: Yes.

23 MR. CHARNOFF: The suggestion is, as I understand
24 it, Dr. Tamplin can stay until 3 o'clock. The suggestion is
25 that we go on with LIFE's case and at the luncheon break we
will prepare our cross and we will be ready with a very short

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1 cross-examination of Dr. Tamplin's case so that he will not
2 have to be recalled.

3 THE WITNESS: I would worry about leaving as late
4 as 3 o'clock. It is very important that I catch my plane.
5 I could stay until 2.

6 MR. CHARNOFF: We could have an earlier break for
7 lunch, as far as I am concerned.

8 MR. ENGLHARDT: Mr. Chairman, I have a proposal to
9 make with regard to this matter. If it would be permissible
10 with the Board to permit the Staff's cross-examination to be
11 conducted by a qualified expert in the field as opposed
12 to having a lawyer, Staff counsel conduct the cross-examination,
13 I think we could conduct our cross-examination expeditiously
14 and within the time frame of today and possibly would preclude
15 the necessity of recalling Dr. Tamplin for further cross-
16 examination at a later date.

17 There is provision in the Rules of Practice in
18 10 CFR Part 2 for expert witnesses to conduct or assist in
19 the conduct of cross-examination of another expert witness.

20 CHAIRMAN SKALLERUP: Dr. Tamplin, we will arrange
21 it so that you do have a high likelihood of being able to leave
22 at 2 o'clock.

23 THE WITNESS: Thank you very much.

24 CHAIRMAN SKALLERUP: Mr. Knight, has Mr. Lau other
25 witnesses to present?

1 MR. KNIGHT: Mr. Chairman, I am not informed at this
2 stage in the morning whether he has other witnesses to present
3 or not. But I intend to reach him by telephone in the next
4 few minutes.

5 CHAIRMAN SKALLERUP: If you would and advise us
6 as to your conversation.

7 MR. KNIGHT: I will.

8 CHAIRMAN SKALLERUP: Mrs. Bleicher, Dr. Tamplin,
9 you are welcome to stay. I gather we probably will not be
10 ready to begin --

11 When would you be prepared to cross, Mr. Engelhardt?

12 MR. ENGELHARDT: May I have a moment to consult
13 and we will be back.

14 CHAIRMAN SKALLERUP: Sure.

15 MR. ENGELHARDT: Mr. Chairman, I have been informed
16 that an hour would be an appropriate time for us to complete
17 preparation and we will be ready then to begin cross-examination.

18 CHAIRMAN SKALLERUP: Will you be able to stay here
19 during this hour?

20 MR. ENGELHARDT: Yes, sir.

21 CHAIRMAN SKALLERUP: So that the work can be
22 commenced now?

23 MR. ENGELHARDT: That is correct.

24 CHAIRMAN SKALLERUP: Then we will proceed with
25 hearing LIFE's witnesses.

1 MRS. BLEICHER: As you can see, neither my client
2 LIFE is not here at the moment through its representative
3 Miss Evans nor Dr. Oster or Mr. Reany. So I can only tell you,
4 to the best of my knowledge, there are no direct testimony
5 witnesses for LIFE in the audience at the moment. We have
6 a witness coming in this afternoon from Bowling Green and we
7 have, as indicated previously to the Board and other parties,
8 several witnesses coming in from out of state next Thursday
9 and Friday as originally scheduled.

10 However, at the present time I have no witness to
11 go forward with.

12 CHAIRMAN SKALLERUP: Mr. Charnoff?

13 MR. CHARNOFF: Mr. Chairman, the arrangement was
14 for LIFE to have its local witnesses present this week and
15 out of town witnesses next week. The Applicant moves that
16 LIFE's direct testimony from its local witnesses be concluded.

17 CHAIRMAN SKALLERUP: Mr. Engelhardt?

18 MR. ENGELHARDT: Mr. Chairman, I think that LIFE
19 has essentially broken its promise with regard to what it
20 would have available in this hearing. I think this is an
21 indication of what is going to be in the future with regard
22 to this proceeding and I think that with regard to local
23 witnesses, if they are not available, and they indicated they
24 would be available, that they should be struck from the witness
25 list.

1 MRS. BLEICHER: I would like an opportunity to speak
2 to the motion just made by Mr. Charnoff.

3 CHAIRMAN SKALLERUP: Yes.

4 MRS. BLEICHER: One of the problem has been, of
5 course, in knowing exactly when the other witnesses for other
6 Intervenors were going to appear. We had two local witnesses
7 in the audience two days ago, one in the audience yesterday and
8 now that one is unable to appear until this afternoon.

9 I would suggest that the Board at least consider
10 having a conference with counsel now to discuss which, if any,
11 of our local witnesses we would be permitted to present,
12 either this afternoon or next week and make its ruling after
13 that conference.

14 CHAIRMAN SKALLERUP: Well, the Board is willing to
15 confer on the matter, so let's have a conference.

16 (Discussion off the record.)

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End #7

DONOVAN#8

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1 CHAIRMAN SKALLERUP: The hearing will come to
2 order.

3 We just conferred about scheduling of witnesses
4 and further dates for holding the hearing.

5 With respect to the latter, counsel and I have a
6 conference telephone call at five o'clock Monday, February 1,
7 for the purpose of exploring matters further and all parties
8 will be advised. The public will be advised of the further
9 date set for the hearing as well.

10 Mrs. Bleicher, have you LIFE's witnesses here to
11 proceed?

12 MRS. BLEICHER: As I believe I indicated earlier,
13 but perhaps I can explain more clearly, LIFE at the present
14 time has no witnesses in the room to proceed.

15 We were informed that we should have some local
16 witnesses available for direct today to fill in the time if
17 Mr. Lau's witnesses were not available or did not fill up the
18 day.

19 We were also informed last night that Mr. Lau would
20 have Dr. Tamplin here and we were hoping to present him as a
21 witness for LIFE as well. Dr. Tamplin has spoken; we have
22 a witness coming in this afternoon. But at the present time we
23 are unable to have any of our other local witnesses here.

24 CHAIRMAN SKALLERUP: The Board recommends that you
25 call your clients in Bowling Green and advise them that if

1 they wish to appear as witnesses at the hearing that they should
2 come forthwith, and any not appearing today, within sufficient
3 time to allow cross-examination, will not be heard in this
4 proceeding.

5 This should come as no surprise to them because
6 they knew the Board was relying on local witnesses to be here
7 today and we would appreciate it if you would convey our
8 concern to them.

9 MRS. BLEICHER: I will do that.

10 CHAIRMAN SKALLERUP. Is Mr. Houston or Dr. Houston
11 present?

12 (No response.)

13 We have just learned through a phone conversation
14 that he is on his way here from Mr. Lau's home, and expected
15 shortly.

16 MRS. BLEICHER: Mr. Chairman, if this is an
17 opportune moment, I would like to introduce two documents into
18 the record and have the record reflect that we have been in
19 touch with Dr. Linus Pauling, who was scheduled to be one of
20 our witnesses.

21 At the time we originally contacted Dr. Pauling, he
22 was very eager to appear and he said that he would. However,
23 in the time since we originally spoke with him he finds that
24 his situation is such that he is simply unable to come.

25 He does have an affidavit which he sent to us

1 which might be appropriate for inclusion as a limited appearance
2 in this proceeding.

3 CHAIRMAN SKALLERUP: We would be happy to proceed
4 with Dr. Pauling's statement on those terms.

5 MRS. BLEICHER: We also received a communication
6 from one of our scheduled witnesses, Mr. Adolph J. Ackerman,
7 a consulting engineer from Madison, Wisconsin.

8 Mr. Ackerman was notified and indicated a great
9 deal of interest in appearing at this proceeding to testify.
10 Subsequent to the time that he did inform us that he would be
11 here, I received the following telegram which I will present
12 to the Reporter and he can reprint it in full on the record --
13 unless you would like me to read it aloud?

14 CHAIRMAN SKALLERUP: Read it.

15 MRS. BLEICHER: "Have received inquiry from Vicki
16 Evans Co-Chairman of L.I.F.E. regarding possibility of
17 my appearance as witness for her group before Atomic
18 Safety and Licensing Board concerning Davis Besse
19 nuclear power station. Since this Board is not empowered
20 to consider company policies and responsibilities at
21 the Board of Director level I consider such hearings
22 totally inadequate for examining the overriding
23 commitments of public utility managements to serve
24 the best public interests with maximum safety. These
25 responsibilities rest on the Board of Directors and

jrb-4

1 and call for the personal appearances and testimony of
2 the Chairman of the Board of each company. In view
3 of my past experiences with other public utility directors
4 I would be prepared to assist your client and appear as
5 a witness provided the Chairman of the Board of the two
6 companies are personally present to testify on questions
7 of company policy and responsibilities which only they
8 are in a position to answer without requiring prior
9 preparation." Signed, Adolph J. Ackerman, Consulting
10 Engineer, dated January 28, 1971.

11 CHAIRMAN SKALLERUP: Will you please allow the Board
12 to see Dr. Pauling's statement.

13 MRS. BLEICHER: Yes.

14 (Handing document to Board.)

15 CHAIRMAN SKALLERUP: We will take a short recess
16 while Mrs. Bleicher makes her telephone call.

17 (Recess.)

END#8

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DONOVAN#9

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1 CHAIRMAN SKALLERUP: The hearing will come to
2 order.

3 Mrs. Bleicher indicated she had a statement to
4 make.

5 MRS. BLEICHER: In my previous discussion of the
6 fact that no other direct witnesses were present here at the
7 moment on behalf of LIFE, I mentioned that two more local
8 witnesses had been here on previous days of the hearing. I
9 would just like to add for the record that they were Mr.
10 Rangswamy, of the Department of Biology, Bowling Green State
11 University, and Mr. Floyd Waddle of the Biology Department
12 of Bowling Green State University, who were here in the room
13 on Wednesday and Thursday but, because of the press of other
14 business and other people testifying, their testimony was not
15 reached upon those days.

16 CHAIRMAN SKALLERUP: The Board will go off the
17 record.

18 (Discussion off the record.)

19 CHAIRMAN SKALLERUP: Mr. Knight, I understand that
20 Mr. Houston is here to testify on behalf of Mr. Lau.

21 MR. KNIGHT: Yes, that is correct, Mr. Skallerup.

22 I would like to ask of the Board what is the current
23 agenda we are following this morning. Is Dr. Tamplin's cross-
24 examination next to proceed?

25 CHAIRMAN SKALLERUP: No, we would hear the witnesses

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1 until such time as the AEC Staff advises that they are prepared
2 to cross-examine Dr. Tamplin.

3 Has that decision been made and is the Staff
4 prepared for cross-examination?

5 MR. ENGELHARDT: Mr. Chairman, I just notice that
6 several of the Staff members have returned, those who were
7 preparing the cross-examination. I will have to check with
8 them to see whether they are ready to go forward.

9 It will be about five minutes.

10 CHAIRMAN SKALLERUP: Mr. Knight, do you know how
11 long Mr. Houston's testimony will take?

12 MR. KNIGHT: No, Mr. Chairman, I don't. I have
13 just had an opportunity to speak with him but a few moments.
14 I will confer with him at this moment and determine to the
15 best of our ability how long it will take.

16 I would like at this time to have an opportunity
17 to spend a little time with him to prepare him for the presen-
18 tation of his testimony, since we just met for the first time
19 this morning.

20 MR. CHARNOFF: I have one comment. I don't have
21 any preference as to which goes first, the staff cross or
22 Mr. Houston. It would be helpful to get Mr. Houston in
23 before the luncheon break, so that we would be able to prepare
24 for his cross-examination during lunch.

25 MR. ENGELHARDT: Mr. Chairman, the staff will be

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1 ready in about five minutes to proceed with cross-examination of
2 Dr. Tamplin.

3 CHAIRMAN SKALLERUP: Well, why don't you confer with
4 Mr. Houston and we will take another recess.

5 (Recess.)

END#9

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1 CHAIRMAN SKALLERUP: Dr. Tamplin, we are ready to
2 conduct the Staff's cross-examination now.

3 MR. ENGELHARDT: Mr. Chairman, the Staff is ready
4 to go forward with the cross-examination. The cross-examination
5 is going to be conducted on behalf of the Staff by Dr. William
6 Bibb and by Dr. Daniel Nelson.

7 Each of these interrogators will deal with a
8 different aspect of Dr. Tamplin's testimony, so that there
9 will be no duplication or repetition with regard to the scope
10 of their questioning.

11 I would first inquire as to whether Dr. Tamplin has
12 a copy of the transcript of this morning's session?

13 THE WITNESS: Yes, I do.

14 MR. ENGELHARDT: As the first order, I would like to
15 call upon Dr. William Bibb, just to identify his professional
16 qualifications, to qualify him as an interrogator, as a tech-
17 nically qualified interrogator, in accordance with the pro-
18 visions of 10 CFR Part 2 of the Rules of Practice.

19 DR. BIBB: My name is William R. Bibb. I am a
20 member of the AEC's Medical Research Branch, Division of
21 Biological Medicine.

22 I received my Bachelor and Master of Science degrees
23 and Doctorate from the University of North Carolina. I was a
24 member of the faculty of the Medical School there prior to
25 going to the Atomic Energy Commission in 1965.

1 Since that time my work has dealt with two major
2 areas; first, the area of organ transplantation and immunology,
3 as well as reviewing low-dose radiation effects on man, and
4 more specifically the basis for the current radiation protection
5 guidelines.

6 CROSS-EXAMINATION

7 BY DR. BIBB:

8 Q What I would like to do, if I could, Dr. Tamplin,
9 is to go through primarily, just for clarification, some of
10 the earlier parts of the testimony.

11 On page 1500 of the transcript, line 8, you discussed
12 the work that you did at Lawrence Laboratories predicting
13 behavior of radionuclides in the environment. I wonder if we
14 could have, for the record, the title of your particular
15 handbook?

16 A Yes. The group that I was in charge of there was
17 called the Information and Integration Group. This overall
18 capability we developed is contained in a series of reports
19 which have the designation, UCRL-50163. There are at the
20 present time five parts. Two additional parts are in prepar-
21 ation. Part 4 of this is a handbook that contains all of the
22 input data that is required to calculate the effects on man
23 of radioactivity in the environment.

24 Q This handbook dealt primarily with behavior of
25 radionuclides in the environment following crater shots or,

1 in other words, weapons detonation shots?

2 A The handbook was intended to be a continuously
3 updated handbook. The material tabulated in the handbook up
4 to this time, the conversion tables in there which are factors
5 that allow one to take a contamination and convert that over
6 into a dosage to man, those particular figures in the handbook
7 are related to a single contaminating event, rather than a
8 continuous thing.

9 The handbook will be updated to include these con-
10 tinuous release situations.

11 But the data in the handbook allows one to go
12 ahead with the continuous release situation.

13 Q The only thing I was trying to establish for the
14 record is the handbook itself, as of right now, applies prim-
15 arily to plowshare-type cratering shots?

16 A No, some tables in there, sets of tables in there,
17 would have their primary usefulness for a single contaminating
18 event. It could be plowshare cratering shots, it could be
19 unexpected leaks from weapons testing, it could also be an
20 unexpected and large single release from a reactor or a spill
21 that resulted in transportation.

22 But the other data in the handbook, with a little
23 bit of calculation, can apply to continuous release.

24 Q Now, continuing on in your testimony, on page 1501,
25 you talk about the International Commission on Radiological

1 Protection, particularly Publication 14?

2 A Yes.

3 Q And on the next page, on page 1502, line 6, you
4 say the Atomic Energy Commission in defending their present
5 standards, always indicates that they rely on the expertise of
6 the International Commission, and the standards which they
7 adopt?

8 A Yes.

9 Q Well, isn't it a fact that the present standards
10 are not based solely on ICRP data?

11 A If I tended to indicate that that was the only
12 source of information, that is incorrect. The International
13 Commission on Radiological Protection is one of the expert
14 bodies. The National Commission on Radiological Protection
15 and Measurements is another. And the Federal Radiation
16 Council is also another one.

17 But the International Commission, with respect to
18 these exposure standards, is the one which the FRC indicated
19 they tend to rely on.

20 So it represents, so far as exposure, one of the
21 primary bodies that is considered.

22 Q I think the point I was trying to establish for
23 the record is that these standards were not in fact developed
24 by the AEC, but are in fact guidance which the AEC receives
25 from the Federal Radiation Council, and that guidance is

1 mutually compatible with that of the NCRP?

2 A The only responsible body for setting these
3 standards into the Code of Federal Regulations is the
4 Atomic Energy Commission. These are their standards. They
5 are not the ICRP's or the FRC's. These are the standards of
6 the Atomic Energy Commission.

end #10

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1 Q But they are based on FRC guidance?

2 A I think that is what I stated, yes.

3 Q Now, I would like to mention just for a moment
4 or ask about the NCRP.

5 Has not the NCRP just this week released handbook
6 39 which is their review of the radiobiology data of the world
7 with regard to the 170 and 500 mr which we have talked about?

8 A This is what I understand. I haven't seen a copy of
9 the report. I might mention that a year ago the NCRP said that
10 they felt that the standards were adequate. So the recent
11 report doesn't add anything except it does add one factor
12 and the way I would interpret that is, from what I have seen
13 in the papers included in that report, and that is that the
14 Lord has delivered the NCRP into our hands.

15 The reason I say that is that the NCRP has recommended
16 that the exposure of pregnant women, the occupational exposure
17 of pregnant women should be reduced by a factor of 10. The
18 general procedure that has been followed is that the exposure
19 to individuals outside of the restricted area should also be
20 reduced by a factor of 10.

21 Since you can't separate exposing pregnant women
22 from unpregnant women, it seems to me the logic says that the
23 guideline exposure out around in restricted areas should be
24 reduced by a factor of 10 to accommodate to the pregnant
25 women.

1 Q But they didn't recommend that?

2 A It is not the least bit surprising to me, either.
3 They seemed at this particular point to want to change the rules
4 in the middle of the game and I think we need other referees.

5 Q Now, with regard to your statement on page 1503,
6 that Appendix 4 of ICRP publication 14, indicates that present
7 standards of whole body exposure is high by a factor of 10;
8 did the ICRP in fact recommend that the present standards
9 be reduced by a factor of 10?

10 A No, they didn't recommend that they be reduced
11 by a factor of 10. They stated that it is better for
12 administrative purposes to not change the standards at this
13 moment. That changing the standards complicates things and it
14 is better not to. They didn't present a public health basis
15 for not reducing the standards. Their major consideration
16 was for administration.

17 It is sort of like changing from the foot to the
18 method system. It would complicate things. But we don't need
19 a change that way.

20 Q But they did not recommend a change in the
21 standards?

22 A No.

23 Q Now, if I could go back just one minute to page 1501,
24 line 7, you talk about allowable radiation exposures. After
25 all, we are talking about 10 CFR 20.

1 Does the word "allowable" appear in 10 CFR Part 20?

2 A You have got me there. You probably know the answer
3 better than I do.

4 Q Well, you know if it had been yes I wouldn't have
5 asked you.

6 (Laughter.)

7 Now, I think the gist of your testimony was that the
8 standards should be reduced, that the present standards are too
9 high.

10 Is that correct?

11 A The drift of my testimony is that the data that has
12 come in prior to setting the present standards indicates
13 that the cancer-producing potential of radiation is about
14 10 times worse than was thought back in 1966. Logic, therefore,
15 says that if the standards were adequate on the basis of in-
16 adequate assumptions in 1966, that the only way they could be
17 adequate today is if they were reduced by tenfold, unless you
18 want to change the rules again in the middle of the game.

19 Q So, as I understand it, you are saying in effect
20 there should be a tenfold reduction in the present radiation
21 protection guidelines?

22 A I am saying that is what the data would suggest,
23 yes.

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End #11

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1 Q Now, if we could go back for just a moment to this
2 tenfold reduction, I think for the record it might be worth-
3 while, since you referred to the so-called fencepost inclusion
4 area limit of 500 mr, and the population exposure of 170 mr,
5 it would be this 500 mr that you feel should be reduced to 50,
6 is that correct? Or the 170 to 17?

7 A Both.

8 Q Well, now, you have 10 CFR controlling such that
9 the fencepost dose would be no greater than 50 mr?

10 A That is what the data would suggest one should do,
11 yes.

12 Now, if I may, the 170 mr, the basis for that was
13 that if one examined the suitable sample of the population and
14 determined that the average dose to that population was 170 mr,
15 then one could feel competent that the worst individual in
16 there was only being exposed to 500. So the two are compatible
17 numbers. It simply depends upon the approach one is using in
18 terms of regulating the reactor.

19 Q In other words, the 50 mr or the 500 mr at the
20 boundary is a more restrictive standard or a more restrictive
21 number than the 170 mr average to the population?

22 A Not necessarily. If, for example, there happens
23 to be a food source in association with the reactors -- I had
24 a letter from a lady in Nebraska who happens to have a ranch
25 that is a feedlot for cattle. It is just downwind from the

1 stack of the reactor.

2 The question she asked me was, since my beasts are
3 distributed to some one million people, shouldn't the
4 restrictions be placed on the reactor be a little more severe
5 than if my feedlot wasn't here.

6 So it depends on the situation as to which might
7 be the most restrictive.

8 Q If we might take a hypothetical case, suppose you
9 choose the 17 mr average within a radius of five miles of
10 that reactor. What would the exposure be at the boundaries
11 to come close to that 17 mr?

12 A The exposures at the boundary could be below 50 mr
13 and people living 50 miles away from the reactor could be
14 exposed to 17 mr as a result of food products

15 If you are talking about krypton-85 in the air,
16 then the limit at the reactor boundary as a result of dilution
17 of the krypton-85 from that particular reactor would rapidly
18 fall down below the 17 mr per hour.

19 If you are talking about krypton-85. If you are
20 talking about cesium-137 or iodine-131, or if you are talking
21 about radioactivity released in the water where people living
22 100 miles away may eat fish, you are talking about something
23 different.

24 If you are talking about krypton-85, then the
25 fence boundaries are most restrictive.

jrb-3

1 Q Do I understand you correctly to say that krypton-85
2 would be dispersed but the other radioisotopes would not be
3 dispersed?

4 A I am saying krypton-85 will not experience signifi-
5 cant concentrations within food chains.

6 Q But isn't it a fact that there is going to be
7 dispersion in the atmosphere of all of the radioisotopes
8 coming out of the stack?

9 A Yes

10 Q And there is going to be more than one radioisotope
11 coming out?

12 A Yes.

13 Q And there are certainly provisions in 10 CFR 20 for
14 putting more restrictive standards on various radioisotopes
15 known to reconcentrate in the food chain?

16 A Such as what?

17 Q Such as the seven-hundredfold reduction of
18 iodine-131?

19 A What else?

20 What about cesium? What is the restriction in the
21 food chain of cesium?

22 Q Well, I'm going to let Dr. Nelson go into your
23 model of cesium.

24 What I am trying to do is establish that:

25 One, there are provisions in 10 CFR 20 for limiting

jrb-4

1 releases if reconcentration mechanisms are known to exist.

2 A These are after the fact. Once the reactor is
3 built and operating, one is then going to come back in and
4 tell the reactor it can't operate because it is exceeding
5 the population exposure because of some unsuspected food chain.

6 Now, that seems to me to make it a very difficult
7 kind of a situation for a reactor engineer to build against
8 such a design objective, because it is not numerical. I
9 would contend that these kind of site surveys should be
10 conducted prior to the construction of the reactor, so that a
11 very solid set of design objectives could be submitted to
12 the engineer.

13 I don't think it is appropriate for some industry
14 to spend three or four hundred million dollars to build
15 something that you may find out by monitoring afterwards can't
16 operate.

17 Q Can't operate in the sense that it would exceed
18 certain limits, is that what you mean by "it can't operate?"

19 A Yes. I can just refer you to the environmental
20 hearings or the hearings before the Joint Committee on Atomic
21 Energy on the Environmental Effects of Producing Atomic Power.
22 I think it is in part 1, beginning around on page 205, where
23 Commissioner Thompson and Commissioner Johnson are answering
24 questions from Congressman Hollifield relating to altering the
25 guidelines, making them more restrictive, making the guidelines

1 come closer to the PSAR's, for example.

2 The response in there by Commissioner Thompson is
3 that we can't at this time change the guidelines because we d
4 don't have enough experience to know how big a cushion we
5 need to allow, and Commissioner Johnson later on in the
6 testimony went ahead and essentially seconded the statements
7 made by Commissioner Johnson.

8 So that is my feeling with respect to the
9 standards.

END#12

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1 Q If I could pursue this for just a moment, partic-
2 ularly the area of design criteria for giving the engineers
3 some numbers, what numbers are we going to give him? 17 mr,
4 50 mr? We have to give him some guidance, as I understand your
5 testimony?

6 A Yes.

7 Q What should that guidance be?

8 A I wouldn't profess to set that, myself. I simply
9 tried to indicate here that the data that has come in since
10 the present guidelines were established indicates that the
11 situation is more hazardous than imagined, and therefore the
12 standards should be reduced.

13 I couldn't think it is my decision to say where
14 the standards should be reduced to. I think that is a
15 decision that should involve a much larger segment of society
16 than myself.

17 Q Don't they in fact involve a large segment of
18 society?

19 A Not in my impression. I don't consider the NCRP
20 or the FRC or the ICRP as being representative of society.

21 Q Well, isn't it true that the FRC guidance is
22 promulgated to all Federal agencies on the signature of the
23 President?

24 A Yes, I think that was the case. Of course, there
25 is no longer an FRC.

1 Q Unfortunately, however, we are still dealing with
2 FRC guidance. I submit the President is the only official
3 in this country that has to be elected by all the people.

4 A I would submit that before the FRC was abandoned
5 that the Secretary of HEW and Chairman of the Federal Radiation
6 Council ordered a sweeping review of the standards. So I would
7 say that the standards are being reconsidered at this moment,
8 or were to be reconsidered.

9 Q Well, I think we have so far established that there
10 have been two reviews now, one completed in 1969, ICRP, and one
11 completed which was published this week. And as I understand
12 it, the National Academy of Sciences is conducting a third
13 review.

14 So I think the standards are being reviewed, aren't
15 they?

16 A As I indicated earlier, the NCRP over a year ago
17 indicated they didn't see any reason for revising the standards.
18 The National Academy of Sciences, in responding to Senator
19 Muskie, indicated they didn't see any need for altering the
20 standards.

21 This was over a year ago that they made those
22 statements.

23 Interestingly enough, the National Academy of
24 Sciences said they didn't see why the standards had to be
25 altered, but it would take them two years to find out why.

1 Also, I think this sort of -- well, I will drop
2 it there.

3 CHAIRMAN SKALLERUP: The Board is acquainted with
4 these developments.

5 DR. BIBB: I think, Mr. Chairman, what these
6 bodies indicated was that they did not see a need for
7 emergency revision of the standards, and I would only ask Dr.
8 Tamplin if we are not talking about two things: an emergency
9 or demand that the standards be reduced now, as opposed to a
10 reduction in standards possibly after an orderly scientific
11 review of the data?

12 THE WITNESS: I think the standards should be
13 revised now, personally, and I think this for a number of
14 reasons.

15 To begin with, the standards are not only designed
16 to regulate nuclear power reactors; reactors are also
17 designed -- the guidelines apply to fuel reprocessing
18 facilities. They apply to waste disposal, and they apply
19 to the AEC's program, which the best way to describe it is
20 an answer going around looking for a question.

21 That is the plowshare program.

22 Also, the Atomic Energy Commission and the nuclear
23 industry have all the fire and fervor of American Motors, and
24 with this industry they want to get everything out of it but
25 the squeal. So we are seeing a very rapid expansion of the

1 use of isotopes.

2 So I think it is necessary to revise the standards.
3 Moreover, I don't think it is appropriate to allow an
4 industry to develop as rapidly as the nuclear power industry
5 is, and then go in some two years or three years later and
6 present them with more restrictive standards and force them
7 to go into extensive retrofits.

8 If the industry is going to burgeon the way it
9 is being projected, it should have standards that will stand
10 up.

11 It is inconceivable to me that it should take two
12 years to do an orderly scientific review of the data. I
13 just think that is absurd.

14 BY DR. BIBB:

15 Q The only point I was trying to make is what the
16 current exposure of all AEC operations are in view of this
17 demand that the standards be reduced from 170 to some number,
18 say 17. Do you know what the current average exposure to
19 all 200 million people from all AEC operations is?

20 A I don't know, and neither does the AEC.

21 Q Dr. Morgan, testifying in the same hearing you
22 previously referred to, has said I mr. Do you agree with that?

23 A No. I don't disagree with it.

24 MR. ENGELHARDT: That completes Dr. Bibb's portion
25 of the cross-examination. I would now like to call Dr. Daniel

1 Nelson as the AFC Staff's interrogator on another area of Dr.
2 Tamplin's testimony.

3 First, I will ask Dr. Nelson to state his profession-
4 al qualifications.

5 DR. NELSON: I am Daniel Nelson. I went to school
6 at Iowa State College, and received a degree in Zoology in
7 1947.

8 I received a degree in Fish and Game Management at
9 Oregon State University in 1949, and a PhD in Zoology, with a
10 Major in Ecology in 1957.

11 I worked for the Georgia State Game and Fish
12 Commission as a research project leader from 1949 to 1953.
13 I was Assistant Professor of Biology at West Virginia Univer-
14 sity from 1957 to 1959, where I taught general biology,
15 ichthyology, limnology, fisheries biology, and other courses
16 for teachers dealing in natural history.

17 Since 1959, I have been employed at Oak Ridge
18 Laboratories, where I was an ecologist in the Radiation
19 Ecology Section, and I am now Assistant Director of the
20 Ecological Sciences Division, where we work with behavior and
21 effects of radioactivity in the environment.

ED #14
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1 BY DR. NELSON:

2 Q Dr. Tamplin, on page 1510, on line 20, you have a
3 statement there that MPCs have very little relevance to the
4 real world. I think this is part of your contention,
5 that the MPCs contained in 10 CFR 20 do not relate to the
6 real world?

7 A Yes.

8 Q Let's talk about the real world and in your
9 presentation you gave a source term, cesium 137, that went from
10 the air to the grass to the cow to the milk to a little boy.

11 Do you call this a food chain?

12 A Yes, I think it is generally referred to as the
13 cow-milk food chain.

14 Q All right, let's go through this food chain, step
15 by step.

16 The source then is what in this case?

17 A It is the allowed concentration of cesium in the
18 air.

19 Q In air, cesium 137 in air?

20 A Yes.

21 Q How do you move this cesium 137 in air -- where do
22 you find this allowable concentration in air? Is it stack
23 gases?

24 A That happens to be the MPC in air. I can find it
25 anywhere so long as it is allowed. I can find it coming out

1 of the chimney in a biochemical laboratory at the University
2 of California. I can find it in the air as a result of a
3 plowshare excavation shot or a nuclear weapon test. I am
4 allowed by law to put that much in the air. That is my
5 impression of what that means.

6 Q And you are saying that we can find this in air coming
7 from the stack of a nuclear reactor?

8 A I don't think I said that. I hope we can't.

9 Q Can it be found coming from the stack of a reactor?

10 A Cesium 137 should be possible to get out of the
11 stack of a nuclear reactor, yes.

12 Q So you would agree, then, that it can be found
13 coming from the stack of a nuclear reactor?

14 A Yes.

15 Q How do you move the air at MPC levels coming out
16 of the stack of a nuclear reactor to the grass over a pasture
17 without dispersion or dilution?

18 A Well, you can't.

19 Q You can't?

20 A No.

21 Q So then the model that you presented has a certain
22 unrealistic feature to it; is that right?

23 A I think you have --

24 Q At this one step, from the forest to the grass?

25 A I think it is quite obvious what I was saying here.

1 DR. JORDAN: May I just interrupt for a moment?

2 I believe there is some confusion here. As I
3 understand it, and please correct me if I am wrong, the MPCs
4 are the allowed concentrations at the boundary of the plant,
5 not the stack. So therefore you could find it presumably in
6 the air at the boundary. I think that is correct.

7 DR. NELSON: Okay.

8 CHAIRMAN SKALLERUP: Also for purposes of this
9 inquiry, it is not essential that it come from a nuclear plant.
10 We are concerned with the validity of the regulations.

11 DR. NELSON: All right.

12 MR. CHARNOFF: Excuse me, just one comment on that,
13 if I may, Mr. Chairman.

14 I think we are concerned with the regulation at
15 least as it applies to nuclear power reactors. If one looks at
16 the Baltimore issue in this case, there has to be some
17 relationship to an issue in this proceeding.

18 I am not objecting to this line of questioning but
19 certainly there are questions in the first instance as to
20 whether this kind of isotope can come from a reactor of this
21 type.

22 Yesterday's testimony I think suggested that
23 cesium 137 isn't coming from this reactor.

24 CHAIRMAN SKALLERUP: Please proceed.

25 DR. NELSON: All right.

ty 4

1 BY DR. NELSON:

2 Q We are assuming that we have MPC concentrations of
3 cesium 137 in the air at the site boundary.

4 Will further dispersion and dilution in the air
5 occur from the site boundary as we move away from the stack?

6 A Depending upon the meteorological conditions you
7 will have more or less dispersion of the material as it moves
8 away from the reactor vent, yes.

9 Q So as we move away from the reactor vent the MPC
10 in air concentrations will decrease to less than MPC levels;
11 is that right?

12 A Yes.

13 Q Okay.

14 Have you ever milked a cow?

15 A Women, yes; cows, no.

16 (Laughter.)

17 Q Have you ever lived on a farm?

18 A Yes, I have lived on a farm but I didn't milk the
19 cows.

20 CHAIRMAN SKALLERUP: We have a technical witness
21 here to ask technical questions. Let's get down to the questions.

22 DR. NELSON: I think this is very pertinent to the
23 case because Dr. Tamplin has used a grass-cow-milk food chain
24 and we have to establish his relationship and his knowledge
25 with milking a cow --

ty 5

1 THE WITNESS: I have never had a relationship with
2 a cow.

3 (Laughter.)

4 BY MR. NELSON:

5 Q All right.

6 Well, what do cows eat?

7 A Well, as I have driven around the country I have seen
8 them eating the grass that grows in the pasture. In some
9 areas of the country they don't put the cows directly
10 out on pasture, they grow alfalfa and chop it and bring it in
11 and do what they call green chop feeding. In other places they
12 use dry feed.

13 There are two reasons why they use these other
14 methods. One is if they put the cow on pasture they don't
15 get effective pasture utilizations. So in many places they
16 use green chop feeding and get much more effective
17 utilization that way. Moreover as long as the cow is standing
18 still and not moving around to get its food, they tend to produce
19 more milk.

20 So it depends on where you are. But in many parts
21 of the country, yes, cows are put out on pasture and it is
22 not strip pasture, it is just random pasture.

23 Q Do they ever give supplemental grain feeds to cattle?

24 A In many dairy farms they will add materials to the
25 feed, yes.

ty 6

1 Q This is a general practice, then, I assume?

2 A I am not familiar with how generally that applies.

3 We had a rather extensive report prepared and it is referenced,
4 and I don't have the reference to it right now, a report
5 prepared by John Frund of our group on dairy practices in the
6 United States in order to arrive at the effective area of the
7 pasture consumed by the cow per day and this also talks
8 about the difference between storage feed and green chop feed.

9 Q Okay.

10 In effect what you are saying then in your model is
11 that all of the releases of cesium at MPC during the 24-hour
12 period are the grass and the cow eats all of this grass; is
13 that correct?

14 A Let me put this into a context which may eliminate
15 much of our difficulty here. I was referring to the 500
16 millirem limit for the individual. Let us simply put this in
17 the context of the family cow who is quite often just roaming
18 around on pasture.

19 Q Well, you were giving the example of cesium at
20 a concentration of 2.2 times 10^{-9} microcuries ml of air and we
21 were using this. But in effect this concentration in air is
22 becoming then food of cattle as the cesium is deposited on
23 grass, is that correct?

24 End #14 A That is true.

25

DONOVAN#15
jrb-1

1 Q This is input to one cow? Is that right?

2 A In this case I said let's simplify it to that
3 point. On the other hand, let's pick a dairy herd such as
4 this woman who has this cattle ranch downwind from the reactor.

5 Q Okay.

6 How much milk does a cow give?

7 A I think the general figure that we found, which was
8 a pretty good average, about 10 liters a day.

9 Q Ten liters a day?

10 A I can't remember that precise number.

11 Q I think you will find that most dairymen will go
12 broke if their cows don't give somewhere about 25 liters a day,
13 that is the economic break-even point on the dairying
14 operation.

15 A As I say I would have to get that particular report
16 to refresh my memory, but my impression is that the figure
17 that is generally used, I think it may have been 15, but it is
18 in the neighborhood of 10 to 20 liters per day.

19 CHAIRMAN SKALLERUP: Mr. Engelhard, are you
20 acquainted with the line of cross-examination, and should this
21 be brought out in accordance with direct testimony?

22 BY DR. NELSON:

23 Q But your model makes the assumption that all the
24 cesium goes into one liter of milk which is consumed by a boy?

25 A No. The model doesn't really concern itself too

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1 much with the daily amount of milk which is coming out of the
2 cow. What the model includes in it is a factor which relates
3 to the fraction of the cesium consumed by the cow that is
4 secreted in each liter of milk. So that the total yield is
5 not significant to the calculation.

6 In the calculations, if my memory serves me correctly,
7 and this is based upon data that has been collected from fall-
8 out and so forth, that one percent of the cesium consumed by
9 the cow per day is secreted in each liter of milk.

10 Q Would you read page 1508, the paragraph starting
11 at line 15?

12 A Yes.

13 Q That paragraphs say in part, the child consuming
14 one liter of milk per day would get a whole body dosage of 7
15 rads as a consequence of just that one day's deposition?

16 A That is right. Do you want me to step through that
17 a little bit?

18 Maybe we can save some time in order to show you
19 what goes on in there. Now, what we do first is take the
20 cesium concentrations in the air. I said it would be maintained
21 in the air for 24 hours. So when I multiply the 24 X the
22 2×10^{-9} , I get 48×10^{-9} microcurie hours per liter cubed in the
23 air. So I get the integrated concentration in the air.

24 Now, other data indicates that particulate material,
25 and we would anticipate that the cesium would be particulate

jrb-3

1 material in the air, would be deposited from the air with a
2 deposition velocity of some 17 meters per hour.

3 So therefore, if we multiply those two numbers
4 together, if my recollection is right, we will get a deposition
5 from that one day of about 82 microcuries per meter square.
6 This then gives us the concentration of the cesium on the
7 forage.

8 The data that I was referring to that Kuranda
9 brought up indicates that on the average the cow consumes
10 the forage contained on 25 meters squared per day. So this
11 then gives us the amount of cesium 137 that the cow would
12 consume.

13 Now, one percent of that is secreted into each
14 liter of milk that the cow puts out. So this then gives us
15 the concentrations in the cow.

16 There is another factor that goes in here and that
17 is how long the cesium deposited in that one day will remain
18 on the forage to be consumed in subsequent days. Looking
19 over all the data that was available on that, we arrived at a
20 half-time for cesium on forage as being about 14 days.

21 So this is also plugged in. So the cow is actually
22 consuming cesium for something like a month after the first
23 day's deposition.

24 Once we have the concentration per liter of milk,
25 we now have the intake that the child is getting. The data

1 indicates all of this cesium in the milk will be absorbed in the
2 child.

3 At this moment I don't remember the biological
4 half-life of the cesium in the body, but it seems to me it is a
5 number somewhere around the neighborhood of a month. So we
6 put all of those together and we come up with the dosage that
7 the child will get from consuming a liter of milk from this
8 cow who is on pasture as a result of that single contamination.

9 Q Now, I think you are just going around back the
10 other way, because you are now saying in this model that you
11 are putting the whole day's deposition of cesium over one
12 square meter, is that correct?

13 A No. I am saying the concentration in the air is
14 this, and therefore the deposition on each square meter is
15 this amount. So if the cloud covers the entire pasture then
16 the entire pasture is covered with this level of deposition.

17 Q Okay.

18 How much cesium goes up the stack of a reactor?

19 A It depends entirely on the integrity of the fuel
20 elements. I think that if one were to look at say the
21 Dresden reactor as it is operating today, you would get one
22 number. If you looked at the Humboldt reactor you would get
23 another number; and if you looked at the reactor in Pleasant
24 Valley, California, you would get another number.

25 I think it is entirely possible for a nuclear

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1 reactor to seriously restrict the emission of cesium from its
2 stack. But that depends pretty much on the integrity of the
3 fuel elements and also on the holdup time in the boiling
4 water reactor.

5 Q Thank you.

6 Are you aware of other models, predictive models,
7 of the type you are using that people have developed around the
8 country or elsewhere in the world?

9 A Yes,

10 Yes, I guess I am, and for the most part there is
11 very little discrepancy.

END#15

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1 Q Well, suppose we took some other numbers. You said
2 that the dispersion coefficient which you have used -- you
3 have not used a dispersion coefficient for gaseous cesium 137.
4 I think a realistic dispersion coefficient would be somewhere
5 from 10^4 to 10^5 times, isn't that right?

6 A I am afraid I am not familiar with it.

7 Q Or the dilution factor we will call it.

8 A I don't think I can answer that because I never
9 heard of such a term.

10 DR. JORDAN: Here again I think there is some con-
11 fusion because the coefficient you are talking about is the
12 dispersion between the stack and the boundary.

13 Am I wrong about that?

14 In any event, what we are talking about here is the
15 MPC of the related number given at the boundary, which would
16 be presumably available for deposition.

17 DR. NELSON: I would expect this dispersion to
18 continue particularly under windy conditions.

19 DR. JORDAN: Yes, it can be expected that con-
20 centration further downwind would be less than that. But at
21 the boundary at the moment one assumes the MPC.

22 BY DR. NELSON:

23 Q You are assuming 100 percent retention on grass.
24 Is this a realistic assumption?

25 A What I indicated is that the deposition velocity

1 as measured turns out to be about 17 meters per hour. The way
2 this has been measured, the data used to arrive at this was
3 that they measured the integrated concentration in air and
4 cut the grass and measured the concentration on grass and those
5 two numbers together give you the deposition velocity.

6 DR. JORDAN: I was wondering also where the number
7 17 came from. Can you give me something to refer to on that?

8 THE WITNESS: Yes, we have a report on this which
9 was prepared by H. Leonard Fisher. I don't know the precise
10 reference to it now but I can certainly send a copy of that
11 report to the Board when I get back to the laboratory. It is
12 called "Deposition Velocity of Particles on Pasture Plants."
13 That is the title of the report. I can send that to the Board.

14 DR. JORDAN: Thank you.

15 BY DR. NELSON:

16 Q Well, we have already established that cows did not
17 live exclusively off grass; is that right?

18 A I guess that is right, yes.

19 Q So we have dilution.. There is a question about 100
20 percent retention of cesium on grass, as far as the model is
21 concerned, and cows don't eat all the grass or cows don't have
22 100 percent of grass in their diet.

23 A The number that I used, 45 meters squared, are
24 the numbers that have been derived from studies of agricultural
25 practices that actually measure the amount of grass consumed

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1 per day by a cow. They are independent of what other kinds
2 of supplement a cow may get in the barn. These were measurements
3 performed by people in agricultural schools related to the
4 dairy industry.

5 So that is where they come from.

6 I can also send a copy of that report to the Board.

7 Q Well, are cows going to stand right at the boundary
8 fence and do all of their eating there? Is this realistic?

9 A I think it is absurd to assume that.

10 Q Okay. Well, you calculated then that the boy would
11 get 7 rads per day. What do you think would be a realistic
12 dose for a boy for 30 years, if we put some realistic
13 assumptions into the model?

14 A I am afraid I didn't understand the question.

15 Q Well, you calculated on the basis of your assumption
16 in your model that a boy would get 7 rads per day. As I say,
17 we have already decided that some of the assumptions in your
18 model were not very realistic, in fact you even called one of
19 them absurd.

20 A Well, I don't think you can make that plural. You
21 have decided, I haven't.

22 Q Okay.

23 Some of the calculations we have run indicate that
24 a 30-year dose, using realistic assumptions, might be 5 milli-
25 rems which is quite a bit different than 7 rads per day.

1 CHAIRMAN SKALLERUP: I think you really ought to
2 take a short break and consider whether this shouldn't be
3 brought out in your direct or rebuttal testimony.

4 MR. CHARNOFF: Mr. Chairman, could I raise a
5 legal matter with regard to this portion of Dr. Tamplin's
6 testimony and this portion of cross by the Staff?

7 The legal matter is that the -- and I am quoting
8 from the Calvert Cliffs decision, -- the Board does not foreclose
9 a license proceeding challenge to the validity of the
10 regulations if the contested regulation relates to an issue
11 in the proceeding.

12 I think much of Dr. Tamplin's testimony with
13 regard to cesium and much of the cross-examination with regard
14 to cesium depends upon whether or not a reactor that is
15 the subject of this proceeding will release the cesium.
16 While it may be relevant to other forms of challenges in
17 Part 20 in other forms of proceedings, it is not relevant to
18 a challenge of Part 20 in this proceeding unless it can be
19 demonstrated that this reactor will release this form of
20 cesium.

21 CHAIRMAN SKALLERUP: What is your conclusion?

22 MR. CHARNOFF: My conclusion is that both the
23 direct testimony relating to cesium in the cow-milk chain and
24 other forms of cross-examination in this regard is irrelevant
25 and should be terminated.

1 CHAIRMAN SKALLERUP: The Board would like a short
2 conference.

3 (Discussion off the record.)

4 CHAIRMAN SKALLERUP: Dr. Nelson, you may resume.

5 BY DR. NELSON:

6 Q Dr. Tamplin, on page 1509, starting on line 16,
7 you state an example whereby fish are living in river water
8 at MPC?

9 A Yes.

10 Q I notice that on that line, the river at MPC, the
11 fish flesh caught in the river at MPC would be 100 times higher.
12 Is that what you said?

13 A 1000 is what I said.

14 Q So we should correct that number?

15 A Yes.

16 Q Would you expect all the fish in the river to
17 contact the outlet pipe, and be exposed to water at MPC con-
18 centration?

19 A If I may, I am referring here to what the allowable
20 concentration in the river can be, based upon 1. CFR 20.

21 Again, I would like to say that these regulations apply to
22 the total atomic energy in a particular ecological region.

23 There could be a number of reactor sites, there could be fuel
24 reprocessing plants, there could be large industrial uses of
25 radioactivity, there could be a waste disposal site, there

1 could be all manner of activities associated with that
2 particular river.

3 Now, I am referring here to the allowable concen-
4 tration in that river as a result of the total atomic energy
5 activities that might take place in that particular ecological
6 region.

7 Q I thought that 10 CFR 20 applied to concentrations
8 at the point of release. So the only way you could do that
9 then would be for a reactor to take in the entire discharge
10 of the river, and add enough cesium-137 to that to bring it
11 up to the MPC level.

12 A Well, I imagine what I could do, I could have 10
13 reactors putting in 20 percent, and I could have a couple of
14 fuel reprocessing plants putting in 30 percent, I could have
15 industrial uses putting in so much. I could make it up.

16 Q So with 10 reactors and two fuel reprocessing
17 plants, you could do this?

18 A You could do it with one reactor if you wanted to.

19 Q Okay, I think we will close the questioning there.
20 I am just attempting to show the relevance of the assumptions
21 to the actual conditions.

1 MR. ENGELHARDT: Mr. Chairman, we will complete our
2 cross-examination with that.

3 CHAIRMAN SKALLERUP: If I recall, you wanted an
4 hour which you would take during the noon break to prepare
5 your cross-examination?

6 MR. CHARNOFF: That is right, but in the interest
7 of moving on, Mr. Chairman, I think we would handle the reply
8 to Dr. Tamplin's testimony on rebuttal and we would propose to
9 move on to Mr. Houston's testimony and any of LIFE's witnesses
10 that are present.

11 CHAIRMAN SKALLERUP: Then, Dr. Tamplin, you are
12 finished, in one sense anyway.

13 THE WITNESS: I hope I don't have to take that
14 literally.

15 (Laughter.)

16 CHAIRMAN SKALLERUP: Unless you want to make a
17 rebuttal statement to clarify a point that you feel is left
18 ambiguous as a consequence of the question.

19 THE WITNESS: No, I think the only thing I would
20 say is that in discussing the standards per se as I have here
21 today, both the primary standard and the secondary standard,
22 that I didn't conceive of this as being a serious indictment
23 of nuclear reactors as such. I have many other reservations
24 against this. I think it is entirely possible in normal
25 day to day operations for reactors to meet much more rigid

1 regulations than we see recorded in the code of federal
2 regulations.

3 Moreover, I feel they absolutely should be required
4 to meet more rigid regulations because I think the only
5 protection that the public has in this situation is the
6 regulations.

End #18

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1 I don't think we can count necessarily on fair play
2 on the part of the industry and to a considerable extent I
3 think it would not be reasonable for the industry to be
4 expected to spend large sums of money to be more reasonable
5 than reasonable standards.

6 But my concern with respect to the standards is that
7 nuclear reactors aren't the whole nuclear industry. There
8 are fuel reprocessing plants, their waste disposal. There is
9 a tremendous desire on the part of the Atomic Energy
10 Commission to push plowshare programs. There is a rather
11 rapidly expanding use of radioisotopes in this country. So
12 that my reference to the standards refers to the total industry
13 and I think maybe one might consider or should consider then,
14 so far as nuclear reactors go, to slice up the pie and give
15 them a set of standards and wait for something else to come
16 along that you feel you ought to give something to -- certainly
17 the standards would seem to me to be inappropriate.

18 CHAIRMAN SKALLERUP: Thank you.

19 Mr. Knight, are you ready to proceed with Mr. Houston?

20 MR. KNIGHT: Has the Board determined we are going
21 to continue without a break for the noon hour?

22 CHAIRMAN SKALLERUP: No, we have made no such
23 determination.

24 MR. KNIGHT: It was my understanding that we would
25 be breaking sometime around 12:00 noon until sometime around

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1 1:00. Since it is 20 after 12:00 now, I could use the
2 additional time over lunch to meet with Mr. Houston.

3 CHAIRMAN SKALLERUP: Well, we will break for lunch
4 and return at 1:30 in that case.

5 (Whereupon, at 12:20 p.m., the hearing was recessed
6 until 1:30 p.m.)

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A F T E R N O O N S E S S I O N

(1:30 p.m.)

CHAIRMAN SKA LERUP: The hearing will please come to order.

I will hand the Reporter the affidavit of Dr. Linus Pauling, and request that he include the text of it in the transcript, but simply make reference to the article from the September 1970 Bulletin of the Atomic Scientists.

(The affidavit follows:)

My full name is Linus Carl Pauling. I was born in Pol land, Oregon on 28 February 1901. I attended the public schools in Condon, Oregon, and Portland, Oregon, and was an undergraduate in the Oregon State Agricultural College (now Oregon State University) from 1917 to 1919 and 1920 to 1922. I received the degree of Bachelor of Science in Chemical Engineering in 1922. I served as full-time Instructor in quantitative chemical analysis in the Oregon State Agricultural College during the year 1919 to 1920. I was a member of the staff of the California Institute of Technology from 1922 to the present time, serving as Professor of Chemistry and Chairman of the Division of Chemistry and Chemical Engineering during much of this period. My present appointment in the California Institute of Technology is as Research Associate. I am now Professor of Chemistry in Stanford University.

I have published over 400 scientific papers and

1 several books: The Structure of Line Spectra (with S.
2 Goudsmit), Introduction to Quantum Mechanics, with Applications
3 to Chemistry and Physics (with E. Bright Wilson, Jr.), The
4 Nature of the Chemical Bond, The Chemical Bond, General
5 Chemistry, College Chemistry, the Architecture of Molecules,
6 No More War!, Science and World Peace, and Vitamin C and the
7 Common Cold.

8 My principal fields of research have included
9 quantum mechanics, the electronic structure of atoms, the
10 determination of the structure of crystals by the x-ray dif-
11 fraction method, the determination of the structure of gas
12 molecules by electron diffraction, the nature of the chemical
13 bond, paramagnetism and ferromagnetism, the magnetic properties
14 and structure of hemoglobin, the conformation of polypeptide
15 chains in proteins, the structure of antibodies and the
16 nature of serological reactions, the discovery of an abnormal
17 hemoglobin molecule as the cause of the disease sickle-cell
18 anemia, the development of the concept of molecular disease,
19 the molecular theory of general anesthesia, the molecular basis
20 of mental disease, the role of vitamins in schizophrenia, the
21 development of the concept of orthomolecular medicine, the
22 structure of the nuclei of atoms, and the nature of the
23 process of nuclear fission.

24 I received the degree of Doctor of Philosophy from
25 the California Institute of Technology in 1925, with major in

1 chemistry and minors in physics and mathematics. I have
2 received honorary degrees from 28 universities, and many
3 medals and awards, including the Nobel Prize in Chemistry
4 for 1954 and the Nobel Peace Prize for 1962 (awarded in 1963.)

5 In connection with my study of nuclear weapons
6 and international relations, including the question of the
7 desirability of an international treaty to stop the testing
8 of nuclear weapons in the atmosphere, I made a thorough study
9 of radioactive fission products and radioactive carbon 14
10 in relation to genetic damage done to human beings and also
11 the somatic damage, principally the cancerogenic action.
12 Some of these studies were described in my book "No More War!"
13 (Dodd, Mead and Company, New York, 1958; paperback edition,
14 Liberty Prometheus Book Club, New York, 1959; revised paper-
15 back edition, Dodd, Mead and Company, New York, 1962), and in
16 several papers, including "Genetic and Somatic Effects of
17 Carbon 14," Science 128, 1183 (1958), and "The Effect of Stron-
18 tium-90 on Mice" (with Professor Barclay Kamb,) Proceedings
19 of the National Academy of Sciences, U.S. 45, 54 (1959).

20 I have also written a paper entitled "Genetic and
21 Somatic Effects of High-Energy Radiation," Bulletin of the
22 Atomic Scientists, September 1970, pages 3 to 5. Seventeen
23 paragraphs constitute the text of this paper, and constitute
24 the arguments that have convinced me that the allowable dose
25 of whole-body ionizing radiation to the population from

1 peaceful atomic energy activities, as presently set by the
2 United States Federal Radiation Council at 170 millirad per
3 year, should be reduced immediately to 17 millirad per year,
4 or even less, and that nuclear power plants and other atomic
5 energy activities should be designed and constructed with
6 such a limitation in view.

7 (Attached to the foregoing affidavit is a reprint
8 of the article "Genetic and Somatic Effects of High-Energy
9 Radiation," published in September 1970 Bulletin of the Atomic
10 Scientists.)

11 CHAIRMAN SKALLERUP: Mr. Knight?

12 MR. KNIGHT: Are you ready to proceed, Mr.
13 Chairman, with the next order of business?

14 CHAIRMAN SKALLERUP: Yes, we are ready to hear your
15 witness.

16 MR. KNIGHT: Before we determine on behalf of the
17 Intervenor whether Mr. Houston is to be presented as a witness,
18 I would inquire of the Board whether Mr. Lau had completed
19 his cross-examination in the proceedings prior to today?

20 CHAIRMAN SKALLERUP: We don't know.

21 MR. KNIGHT: I take it he has not rested, so to
22 speak. Then on this basis, and forgive me for my lack of
23 knowledge as to what is happening previously --

24 CHAIRMAN SKALLERUP: He never used those words. He
25 never did indicate that he was completed with cross-examination.

1 MR. KNIGHT: Frankly, in the limited amount of time
2 we have today I would request of the Board the opportunity to
3 permit Mr. Houston to be qualified as an interrogator, a
4 cross-examiner, to resume and continue cross-examination,
5 rather than to present testimony directly as a witness himself.

6 CHAIRMAN SKALLERUP: Let's have a conference on
7 that point.

8 (Discussion off the record.)

end 20

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CHAIRMAN SKALLERUP: Mr. Knight.

MR. KNIGHT: Mr. Chairman, I will withdraw my request that I made of the Board to have Mr. Houston act on behalf of Mr. Lau as an intervenor interrogator on cross-examination at this point, and will call Mr. Houston as a witness on behalf of Mr. Lau.

CHAIRMAN SKALLERUP: And this is with the understanding that Mr. Lau still has the right to cross-examine and with the assistance of Mr. Houston at a later date.

MR. KNIGHT: Yes, that is my understanding.

Whereupon,

CARL W. HOUSTON

was called as a witness on behalf of Intervenor, Glenn Lau, and, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

MR. HOUSTON: Members of the Board, Mr. Chairman, my reason for being here today is to question the severity of radiation taken from the standpoint of engineering, not scientifically from the chemical or physics basis --

MR. CHARNOFF: Mr. Chairman, could we have the witness's qualifications stated for the record, please.

MR. KNIGHT: Yes.

BY MR. KNIGHT:

Q Would you state your name?

jrb-2

- 1 A Carl W. Houston.
- 2 Q Would you state your address?
- 3 A Johnson City, Tennessee, Route 2.
- 4 Q Would you state your educational qualifications?
- 5 A I am a mechanical engineer having specialized in
6 welding for many years.
- 7 Q What institutions did you attend?
- 8 A North Carolina State College, known now as North
9 Carolina State University.
- 10 Q Do you hold any academic degrees?
- 11 A A BSME.
- 12 Q Have you had any specialty within mechanical
13 engineering?
- 14 A Yes, I have for the last 25 years. It has been
15 the special field of welding.
- 16 Q Have you had any experience in metallurgical field
17 of mechanical engineering?
- 18 A During this past 25 years I have had the honor
19 bestowed on me as mechanical engineering, welding engineering,
20 metallurgist and metallurgical engineer, although the only
21 degree I hold is mechanical.
- 22 Q Could you relate briefly your background of profes-
23 sional occupational endeavors over the past 10 years?
- 24 A Briefly I can say I have had an extensive amount of
25 experience in the testing or safety area of equipment,

1 machinery, including the welding which is the nucleus today
2 of all construction. I have been in the safety field.

3 In other words, I was with a testing laboratory
4 for approximately seven years in Washington, D. C.

5 Q What laboratory is that?

6 A Washington Testing Laboratories. I was supervisor
7 or manager of the laboratory. I supervised at one time 32 men,
8 32 quality control men.

9 Q Have you been employed as an employee or as an
10 independent contractor or consultant with any supplier of
11 any nuclear reactor installation?

12 A Well, I have or have supervised quality control or
13 inspection of reactors, pressure vessels, pressure piping,
14 which we used under nuclear pressure and et cetera, for, I
15 would say, in the past -- since 1957.

16 Q Could you indicate what contractors you have
17 worked with or been employed by who are involved in nuclear
18 reactor work?

19 A Well, while self-employed or employed at the
20 laboratory which, actually I was part owner in, to a degree I
21 considered myself employed there. I have worked with such
22 firms as Bonax from Pittsburgh, White from Cleveland,
23 Lincoln Electric Company in Cleveland; B. H. Mahoney of Detroit,
24 Michigan; Northwest Welding Company in Los Angeles, California;
25 Downtown Iron Works; Westinghouse at Pittsburgh -- I could go on.

1 Q What is your professional role?

2 A Well, at present I am acting in the capacity of a
3 consultant, primarily in welding. The reason and so on will
4 be given at a later time during this testimony.

5 Q Are you retained at this particular time by any
6 employer who is involved with directly or indirectly in the
7 construction of any nuclear reactor?

8 A Mr. Chairman, I believe my honorable attorney does
9 not realize the seriousness of what would be involved in that
10 question. I would rather not answer it for the sake of
11 incriminating both he, myself, and Mr. Lau. Presently I
12 am black-balled from construction.

13 MR. KNIGHT: I will withdraw the question.

14 BY MR. KNIGHT:

15 Q Have you examined and are you familiar with the
16 petition of the intervenor, Mr. Lau?

17 A I have closely read the petition.

18 Q Have you examined and have you read and are you
19 familiar with the PSAR documents?

20 A I am very familiar with the PSAR documents. I
21 have read them and am very familiar with them.

22 Q Are you familiar with and have you acquainted your-
23 self with the provisions of Title 10 of the Code of Federal
24 Regulations, Part 100, with respect to siting criteria and
25 emergency standards for siting locations?

jrb-6

1 A Yes, I am. Not by exact numbers, but I know the
2 area and the extent and the severity and so on that is
3 involved. So I am well acquainted with that.

4 Q Are you acquainted with the reference therein to
5 technical document 14844, and the various considerations that
6 it brings into setting guidelines for site locations?

7 A Yes, I am. Should I say I am opposed to it?

8 Q Would you relate how the provisions of the technical
9 document 14844 and Mr. Lau's petitions form his contentions
10 in this case?

11 A Well, there should never, speaking in terms of
12 engineering and as a professional man, there should never be
13 any allowance for any area due to an engineer tested and
14 approved piece of equipment, unless that equipment itself
15 had been placed in active use and under exact conditions under
16 which it is to operate. Then those who desire to risk their
17 lives on the value of the engineering, and I am speaking,
18 gentlemen, as an engineer, and I have done design work. I
19 have done design work and I have been asked to prove them before
20 they are put into production. But on that basis I can never
21 go along with engineering approved equipment until it has been
22 approved in actuality and not from the standpoint of theory
23 in the beginning and possibly from quality control or testing
24 of this equipment in the plant, individual units attached to
25 the reactor or to any other equipment as a total.

1 Q If you will permit me to get more specific, back
2 to a specific contention in Mr. Lau's petition, would you
3 agree that the impact of technical document 14844 as suggested
4 to be implemented by Title 10 of CFR Part 100 was to establish
5 linear distances in terms of feet, yards and/or miles within
6 which any nuclear reactor sitings were to be governed and
7 determined and, if that is the case, would you submit your
8 opinion to this Board and this record as to whether this PSAR
9 and this reactor that is proposed to be established
10 fullfills the suggested guidelines of technical document
11 14844?

12 A No, it certainly doesn't fullfill that document.
13 Actually, any technical formulation or calculation, any tech-
14 nical theory or any engineering data which will substitute a
15 region -- I speak of regions in terms of inches, feet, yards,
16 miles et cetera -- which will be substituted that for the
17 safety of human beings is not fair.

18 I can't say it is going to be exceedingly
19 dangerous; I don't have proof myself. I would be walking into
20 the same trap that I presently see AEC walking into. They
21 can't have proof but it does look logical.

22 But it is unfair for the human beings in and
23 around that area.

24 Q Have you an opinion as to what the exclusion zone,
25 as referred to in Part 100 should be with respect to the

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1 reactor sought to be licensed in this area?

2 A The exclusion zone -- we start, of course, with
3 low populations.

4 Q You do have an opinion as to these considerations?

5 A Yes.

6 Q Well, would you express your opinions both as to
7 low population zone and as to exclusion zone?

8 A Well, starting with the low population, I don't
9 think there should be an inhabitant. This might sound absurd,
10 and if so I stand corrected, not necessarily reprimanded. I
11 am speaking my viewpoint.

12 There shouldn't be an inhabitant within a five-mile
13 radius of any nuclear power station, not even one per square
14 mile.

15 MR. CHANOFF: Mr. Chairman, the issue as I under-
16 stand it is whether the AEC applied correctly or whether we have
17 applied correctly the criteria of 10 CFR Part 100, under the
18 guidance and example that are set forth in the ID 14844 -- not
19 whether or not either of those documents is correct or valid.

END#21

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CHAIRMAN SKALLERUP: That is correct, Mr. Knight.

MR. KNIGHT: Forgive me, Mr. Charnoff and Mr. Chairman, I did not get the import of the objection.

MR. CHARNOFF: The objection was that as I understand it the contention of Mr. Lau was whether or not the AEC criteria with regard to CFR 100, including the referenced example calculations in TID-14844 had been correctly applied by the AEC and by the Applicant in connection with the construction of the plant.

The issue is not whether or not those documents are valid or are correct.

As I understood the thrust of your witness' testimony, it was expressing an opinion as to what exclusion areas ought to contain or low population zones ought to contain.

I think if your witness is qualified at all he is qualified as an expert in metallurgy or welding, he is not qualified about radiation exposures.

BY MR. KNIGHT:

Q Mr. Houston, are you familiar with the thrust of Mr. Lau's contentions in his petition that patently the PSAR does not fulfill the guidelines set forth in 10 CFR Part 100 as supplemented by technical document 14844 and that, therefore, engineering standards and engineering features, additional safeguards contained within the PSAR, have taken the suggested

1 prohibitions of these guidelines out of this case so that there
2 is no reason why this reactor does not satisfy these emergency
3 safeguards?

4 A To answer Mr. Charnoff's reply that I am a
5 metallurgist, I am. I also notice in the PSAR, Section 1,
6 where it says "Power piping to be constructed in the course
7 with the applicable code."

8 Mr. Charnoff, the State of Ohio does not adopt the
9 American Society of Engineers codes and standards. I am
10 pretty much aware that AEC knows this. Without being facetious
11 whatever, they had taken advantage of this elsewhere. This would
12 be the case here now.

13 Now, according to all AEC's past standards and
14 safety, they have never collected a sample of the American
15 Society of Mechanical Engineers codes and specifications and I
16 am speaking of this from the metallurgical and welding
17 engineering standpoint. If not, that can be one of the most
18 disastrous fields that you can find.

19 Thank you.

20 Q Mr. Houston, to go to the limited time we have
21 before us today, I would ask you on behalf of Mr. Lau and
22 myself and the Board, if we could address ourselves to the
23 questions that I am able to put to you and that the Chairman
24 and the Board wishes to have you address yourself to, we
25 must get on to the things that are pertinent here. So I

1 would like to have you answer my previous question as to whether
2 there are engineering safeguards in this PSAR that take this
3 case out of what technical document 14844 would otherwise
4 require?

5 A The question I just answered, Mr. Knight, definitely
6 enters the safeguard standards of the PSAR in this case as
7 you directed. Although to be more implicit, if you wish,
8 my answer would be no, they do not conform. I will stop at
9 that if you wish to ask me anything further.

10 Q In what manner is there a nonconformance of the
11 additional safeguards that would provide this emergency
12 standards?

13 A Mr. Knight, I realize, sir, you are speaking of the
14 safeguard features which are supposed to be redundant to any
15 method of accidents. In other words, according to the
16 standards now of AEC, there could not possibly be an
17 accident due to the safety features and factors now placed
18 in engineering.

19 But, gentlemen, Mr. Knight, these features are
20 all theory and you cannot, you cannot place human lives on
21 and with and through and by a theory.

22 Q Are you suggesting that there has been an inadequate
23 amount of realistic testing done?

24 A In actuality there has been no testing. In
25 actuality, as far as going out and building 125 to 200 million

1 dollar plant, placing these safety features there, excluding
2 everyone in the area of the 25 to 100-mile radius and then
3 those who put faith in these safeguards go in and start the
4 plant in operation, then break the cooling line completely,
5 a sudden and complete loss-of-coolant into the main cooling
6 system and then say they work. I am not saying they won't.

7 I am operating on theory also on this.

8 MR. CHARNOFF: Mr. Chairman, I would like to
9 propose a conference of counsel with the Board.

10 CHAIRMAN SKALLERUP: Let's confer.

Lnd #22,

(Discussion off the record.)

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1 CHAIRMAN SKALLERUP: The hearing will please come
2 to order.

3 DR. JORDAN: Mr. Knight, Mr. Houston, the Board has
4 carefully listened to your testimony up to this point. We
5 feel Mr. Houston has not had adequate time, really, to have
6 studied the PSAR and point out in detail where the PSAR is
7 at fault.

8 The Applicant has said the engineering safeguards
9 are indeed adequate. We understand your feelings about it,
10 and we know what you said; but in order to present your case
11 we feel it would be to your advantage -- we know you have not
12 had much time to see the PSAR, and the designed engineering
13 safeguards -- so we would like you to go back and look at
14 the PSAR of the plant and particularly the engineering
15 design of the engineered safeguards, and then submit to us a
16 written summary of the testimony that you would give, and
17 let us evaluate that. And at that time we would decide whether
18 to call you back as a witness.

19 Would that be satisfactory to you gentlemen?

20 MR. KNIGHT: Do I understand the Board's ruling
21 to be that we have no right to bring him back as a witness,
22 even if we have submitted our contentions in writing at that
23 time?

24 CHAIRMAN SKALLERUP: The Board would like to see
25 the testimony in writing, and then we would have a conference

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1 with counsel, and if there is any objection to the testimony
2 we would hear about it at that time.

3 MR. KNIGHT: Then is it proper to say that we do
4 have a right to present the testimony that we would hopefully
5 submit to the Board, and have an opportunity to support that
6 which we feel is relevant, and to have a discussion of it
7 before such time that it is actually decided whether the
8 testimony is relevant or not, and offer it?

9 More simply stated, do we have a right to submit
10 a written resume of Mr. Houston's testimony at a later date,
11 and have an opportunity to argue and discuss whether it is
12 indeed relevant?

13 CHAIRMAN SKALLERUP: Pertinent to the contentions.

14 MR. KNIGHT: And have the Board make a decision at
15 that time whether he is to be permitted to testify?

16 CHAIRMAN SKALLERUP: That is correct.

17 MR. KNIGHT: And that is the Board's ruling?

18 CHAIRMAN SKALLERUP: Correct.

19 MR. KNIGHT: All right, we understand it now and
20 we have no alternative but to abide by it.

21 CHAIRMAN SKALLERUP: About how long would it take
22 you and Mr. Houston to prepare that statement?

23 THE WITNESS: Two days.

24 MR. KNIGHT: Mr. Houston indicates two days.

25 CHAIRMAN SKALLERUP: Well, the Board will go off the
record. (Discussion off the record.)

end 23

1 CHAIRMAN SKALLERUP: If the document can be put
2 into the mail on Tuesday, February 2, that would be ample
3 time for us to review it prior to convening the next time.

4 MR. KNIGHT: Postmarked on or before Tuesday?

5 CHAIRMAN SKALLERUP: That is right, with copies
6 mailed to the parties.

7 MR. KNIGHT: Fine, we will abide by that if we are
8 able to do so.

9 CHAIRMAN SKALLERUP: Mrs. Bleicher?

10 MRS. BLEICHER: First, I have a small matter that
11 has come to our attention. There is a statement of a party
12 who would like to make a limited appearance that was handed
13 to me this morning. The reason it was handed to me was that
14 this person, who is Sheldon Novick, the Editor of the
15 Environment magazine, authorized David Gitlin, MD, and/or
16 Dr. Erwin Oster to sponsor the statement. I gather it was
17 meant to present it for him to the Board and therefore
18 on behalf of Dr. Oster I would like to present this limited
19 appearance statement from Sheldon Novick.

20 CHAIRMAN SKALLERUP: How long is it?

21 MRS. BLEICHER: It is four double-spaced type-
22 written pages.

23 CHAIRMAN SKALLERUP: The statement by Mr. Novick
24 will be placed in the transcript of today's proceedings.

25 (The statement follows:)

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1 STATEMENT REGARDING THE PROPOSED DAVIS-
2 BESSE NUCLEAR POWER STATION

3 I, Sheldon Novick, editor of Environment magazine,
4 official publication of the Scientists' Institute for Public
5 Information, 30 East 68th Street, New York City, published by
6 the Committee for Environmental Information, 438 North Skinker
7 Boulevard, St. Louis, Missouri, which carries scientific
8 information regarding the uses of nuclear energy and other
9 activities which affect the environment, and author of a book,
10 The Careless Atom, first published in the United States in 1969
11 by the Houghton Mifflin Company, and of several articles deal-
12 ing with nuclear electric power published in magazines and
13 newspapers, and as former Program Administrator of the Center
14 for the Biology of Natural Systems at Washington University,
15 St. Louis, Missouri, a research and training program in
16 environmental biology supported by the U. S. Public Health
17 Service, have the following opinions concerning nuclear
18 power plants. These are my own opinions and are not
19 necessarily those of any of the organizations or individuals
20 with whom I am associated. I am unable to attend the licensure
21 hearing before the Atomic Safety and Licensing Board in Port
22 Clinton, Ohio, on the Davis-Besse Nuclear Power Station, and
23 I hereby authorize David Gitlin, M.D. and/or Erwin Oster to
24 sponsor this statement for me to the licensure board.

25 Electric power generation has grown far more rapidly

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1 than the economy as a whole, doubling every ten years, and this
2 rapid growth is producing a host of environmental problems.
3 Power plants which burn coal and oil produce noxious air
4 pollutants such as sulfur dioxide and nitrogen oxides which are
5 a substantial component of the nation's air pollution problems.
6 Adequate means to control these pollutants are not now
7 available, however, and in order to carry out their plans
8 for growth within increasingly strict constraints on air
9 pollution imposed by public opinion and by government agencies,
10 utilities are constructing or planning nuclear power plants in
11 many parts of the country. They are being encouraged in this
12 trend by the Atomic Energy Commission, which is fulfilling
13 its statutory obligation to promote the peaceful uses of nuclear
14 energy.

15 The combined pressures of constraints on air
16 pollution from conventional plants and the promotional efforts
17 of the Atomic Energy Commission have resulted in the planning
18 and construction of far too many nuclear power plants for
19 prudence. It is widely recognized that an accident which
20 resulted in the release to the atmosphere of even a small
21 portion of the radioactive material contained in an operating
22 commercial nuclear power station would be a disaster of large
23 proportion. The possible effects of such an accident are
24 described in a publication of the Atomic Energy Commission,
25 "Theoretical Possibilities and Consequences of Major Accidents

1 in Large Nuclear Power Plants," March 1957, Document Number
2 WASH-740. This report estimated that 3,400 persons would be
3 killed and 43,000 injured, under the worst circumstances the
4 authors could envision.

5 The authors of this report quote estimates of the
6 probability of such an accident occurring from one in 100,000
7 to one in a billion per year for each large nuclear plant.
8 About 100 such plants are now operating or are planned, and
9 each has an expected lifetime of about 30 years. Using the
10 lower estimate of probability given in the report, this means
11 there is about one chance in 33 that one of the nuclear power
12 plants now planned will suffer a serious accident resulting
13 in tens of thousands of deaths and injuries. This does not
14 appear to be an acceptable risk.

15 At the time this report was prepared, there had been
16 little experience with operating nuclear power plants, and the
17 estimates of accident probabilities given in the report were
18 no more than guesses. It should be borne in mind, however,
19 that there still has not been any experience with nuclear
20 power plants of the size of the proposed Davis-Besse Nuclear
21 Power Station, and the experience with smaller plants has not
22 always been satisfactory. Almost a third of the plants built
23 so far have already been taken out of operation because of
24 technical difficulties.

25 In addition to the risk of accident, nuclear power

1 plants routinely discharge quantities of radioactive material
2 to the air and water nearby. Some of these materials persist
3 in the environment for many years, and can be accumulated by
4 living things, which then present a greater hazard to man when
5 they appear in his diet. It is the common assumption of all
6 agencies concerned with setting standards for radiation ex-
7 posure that any exposure to radioactive materials, no matter
8 how small, increases the risk of cancer and genetic defect
9 in the persons exposed.

10 The magnitude of the damage which results from small,
11 chronic exposures to radiation is difficult to calculate, but
12 the civilian nuclear power program as presently conducted will
13 lead to measurable increases in the radiation exposure of
14 the general population, which will in turn result in increases
15 in the incidence of cancer and inherited malformation. Such
16 increases of radiation exposure are unnecessary, and in a
17 nuclear power program conducted at a more reasonable pace,
18 could be prevented. As the Atomic Energy Commission is bound
19 by Presidential order to reduce unnecessary radiation exposure
20 of the population, it would seem in order to discourage new
21 construction of nuclear plants until techniques for reducing
22 radiation releases to zero can be required on all new plants.

23 Nuclear power plants are being planned and constructed
24 despite these well-known hazards because of the pressures
25 generated by the expansion of electric power utilities, rather

1 than any peculiar virtue of nuclear power. Accordingly, I
2 believe there should be a halt in the construction of all
3 nuclear power plants until a rational energy-use policy is
4 established by the federal government, which weighs the
5 benefits of expanding electric power generation against the
6 hazards of its present use, and the alternative energy sources
7 and consumption patterns which are available.

8 s/Sheldon Novick

9 December 6, 1970

10 IN WITNESS WHEREOF, I Have hereunto set my hand and seal
11 the day and year above written.

12 s/Ruby L. Holley

13 My commission expires: January 3, 1974

14 - - -

15 MR. KNIGHT: Mr. Chairman, I have something I would
16 like to present to the Board and to the record with respect
17 to Mr. Lau's disability as some evidence or some certification
18 of the fact that he is in fact disabled and in fact unable to
19 personally be here to be in charge of the conduct of his part
20 of this hearing.

21 With the permission of the Board I would read it
22 into the record and then submit it to you for inspection and
23 Mr. Charnoff for inspection.

24 CHAIRMAN SKALLERUP: Can you tell us what it is?
25 Is it a doctor's certificate?

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MR. KNIGHT: Yes, it is a certificate from his attending physician that Mrs. Lau has just delivered to me.

End #24₃

CHAIRMAN SKALLERUP: Very well.

1 MR. CHARNOFF: May we have a conference?

2 CHAIRMAN SKALLERUP: Yes.

3 (Discussion off the record.)

4 MR. KNIGHT: Mr. Chairman, I offer the message on
5 this document to the record for whatever purpose it may
6 serve.

7 This states on the office stationery of V. William
8 Wagner, M. D., 122 East Perry Street, Port Clinton, Ohio, 43452,
9 Disability Certificate, dated January 29, 1971. Name: Glenn
10 Lau, Address: Route No. 1; Employer: Oak Harbor, Ohio:
11 To whom it may concern: This is to certify that the above
12 patient was under my professional care from January 26, 1971
13 to indefinite, inclusive, and was totally incapacitated
14 during this time. This is to certify that the above patient has
15 now recovered sufficient to be able to return to (Light)
16 (Regular) Work duties on -- blank -- Restrictions -- blank.
17 And there appears to be Dr. Wagner's signature after the line
18 indicating the place of signature.

19 CHAIRMAN SKALLERUP: Would you pass that, please,
20 to the reporter for inclusion in the public record.

21 MR. KNIGHT: Yes, sir.

22 MRS. BLEICHER : Mrs. Bleicher, this morning it
23 was determined that if LIFE was to be permitted to present any
24 of the testimony of its local witnesses, meaning witnesses in
25 the surrounding communities, these witnesses would have to

1 appear this afternoon.

2 At the request of the Chairman of the Board, I
3 communicated this to my client and also one of the witnesses,
4 Dr. Oster. At the time I telephoned his home this morning
5 he was not there. He was at an examination that he was giving
6 to a doctoral candidate, but the message was conveyed to him.

7 I spoke to him at 1:30 when he received the
8 message and he stated he would attempt to come. And another
9 of the witnesses would attempt to come.

10 However, as I look around the room, they are not
11 here yet. They are probably on their way from Bowling Green
12 to Port Clinton. That is all I can say at the present time
13 about the witnesses except I think that we should give them
14 until the original time set for adjournment today to appear.

15 CHAIRMAN SKALLEFUP: One of the witnesses listed
16 is Miss Vicki Evans. Is Miss Evans going to appear as a
17 witness.

18 MRS. BLEICHER: No. We are withdrawing Miss
19 Evans' name as a witness.

20 MR. CHARNOFF: One of our principal panel member
21 witnesses was Mr. Eugene Novak. Mr. Novak is scheduled to go
22 to school for the next two weeks in connection with this
23 project.

24 I would like to request that Mr. Novak, since the
25 cross-examination by LIFE has been completed and by the

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1 Coalition is completed, and the cross-examination by Mr. Lau
2 may or may not be completed, be excused.

3 If there are complications, we could arrange to have
4 him come back the next day. On the other hand, we have persons
5 present for the applicant who will be capable of talking
6 to the areas within his general area of responsibility. On
7 that basis, I would request the excuse of Mr. Novak from this
8 hearing for the next two weeks.

9 CHAIRMAN SKALLERUP: Any objections?

10 MR. KNIGHT: I would object on behalf of Mr. Lau
11 whose right to cross-examine has not yet been extinguished or
12 concluded.

13 Do I understand his school commences at a time
14 prior to the reconvening of this hearing?

15 MR. CHARNOFF: It commences Monday morning.

16 CHAIRMAN SKALLERUP: Mr. Charnoff said they would
17 bring him back.

18 MR. KNIGHT: After two weeks.

19 MR. CHARNOFF: I said we are scheduled to reconvene
20 after two weeks or the following week and if there are
21 questions that nobody else can respond to in his area, we will
22 arrange for him to come back the very next day from his school
23 and he will be present if necessary.

24 MR. KNIGHT: Oh, then I have no objection to that

25 CHAIRMAN SKALLERUP: The Board grants the permission.

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MR. CHARNOFF: Thank you.

CHAIRMAN SKALLERUP: Well, we will take a break for the balance of our visit.

(Recess.)

END#25

1 CHAIRMAN SKALLERUP: Mr. Reporter, we have an
2 affidavit in support of the Coalition which should be placed
3 into the record.

4 (The affidavit follows.)

5 "County of CUYAHOGA

6 State of OHIO

7 CERTIFICATE OF REPRESENTATION

8 I, Paul Olonyk, residing at 3011 Ludlow Rd., in
9 the City of Cleveland, state under oath that prior to November
10 18, 1970, I authorized and directed the Coalition for Safe
11 Nuclear Power to represent me before the Atomic Energy
12 Commission in the matter of TOLEDO EDISON CO., and CLEVELAND
13 ELECTRIC ILLUMINATING CO. (Davis-Besse Power Station) Docket
14 No. 50-346 and to petition for leave to intervene in the
15 proceeding for the reason, inter alia, that I have a special
16 interest in the protection of the natural resources of the
17 Lake Erie Area and in the conservational, recreational,
18 economic, aesthetic and community impact of nuclear power plant
19 development in the Lake Erie Area and am first and foremost
20 concerned that such nuclear power plants not be built or
21 operated where to do so would be inimical to my health or
22 safety nor be built until the state of nuclear technology
23 has advanced to such a degree that there is little or no
24 radioactive waste or danger therefrom as a result of transpor-
25 tation or storage. The Commission's action will affect my

1 interests if the Commission permits construction of the
2 proposed facility, as it has stated it intends to do, and
3 later licenses its operation, the environmental effects
4 resulting therefrom will adversely affect my health, safety,
5 and economic interest.

6 /s/ Paul Olynyk

7 Signed and sworn to before me this 17th day of December
8 1970.

9 /s/ Rita Staniszewski
10 Notary Public for Cuyahoga
County."

11 CHAIRMAN SKALLERUP: The hearing will adjourn for
12 the time being at five minutes after three, and we will
13 reconvene Monday morning, nine o' clock on February 8. I
14 wish I could tell you where, but it will be in Port Clinton,
15 and we will be sure that there is a public notice of the
16 place of meeting.

17 MR. CHARNOFF: Mr. Chairman, could we reflect on
18 the record that Dr. Oster and the other local witnesses of
19 LIFE did not make any appearance here today?

20 CHAIRMAN SKALLERUP: Is Dr. Oster here, or any
21 other witnesses on behalf of LIFE?

22 (No response.)

23 CHAIRMAN SKALLERUP: I hear no response.

24 The hearing is adjourned.

25 (Whereupon, at 3:05 p.m., the hearing was adjourned, to
reconvene at 9:00 a.m., Monday, 8 February 1971.)