HR - 13

HOUSE OF REPRESENTATIVES
COMMONWEALTH OF PENNSYLVANIA

September 17, 1979

MEMO

SUBJECT: SCHEDULE OF TMI WITNESSES-SEPTEMBER 20 and SEPTEMBER 21, 1979

TO: MEMBERS, Select Committee-TMI

FROM: James L. Wright, Jr., Chairman

The following will appear before the Select Committee TMI on September 20 and September 21, 1979. The Hearings will begin at 10:00 A.M., each day, in the House Majority Caucus Room.

SEPTEMBER 20, 1979

Dr. Gordon K. MacLeod, Secretary of Health
Commonwealth of Pennsylvania

Thomas M. Gerusky, Director, Bureau of Radiation Protection, DER, Commonwealth of Pennsylvania

Dr. Fred Rapp, Associate Provost and Dean
Professor & Chairman, Department of Microbiology,
Hershey Medical Center, Hershey, PA.

James Elder, Schoolteacher, Saxton, PA.

SEPTEMBER 21, 1979

Joseph Higgins, Manager, CBS Affiliate, WHP

Saul Koehler, Executive Editor, The Patriot

Honorable Sheldon Parker, General Manager,
Pa. Public Television Network

Larry J. Messinger, News Director, Technical Operators, Pa. Public Television

Michael J. Ziegler, Executive Vice-President
WITF, Channel 33

Paul Critchlow, Governor's Press Secretary

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COMMONWEALTH OF PENNSYLVANIA
HOUSE OF REPRESENTATIVES
HOUSE SELECT COMMITTEE - THREE MILE ISLAND

* * *

In re: Three Mile Island Hearing

Verbatim record of hearing
held in the Majority Caucus
Room, Main Capitol Building,
Harrisburg, Pennsylvania, on
Thursday,

.. tember 20, 1979
10:00 A.M.

HON. JAMES L. WRIGHT, JR., Chairman
Hon. Bernard F. O'Brien, Vice Chairman
Hon. Nicholas B. Moehlmann, Vice Chairman
Hon. Eugene Geesey, Secretary

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Reported by:
Nancy J. Adelman

Dorothy M. Malone
Registered Professional Reporter
135 S. Landis Street
Hummelstown, Pennsylvania 17036

ALSO PRESENT:

Fred Taylor, Esquire, Counsel
Marshall Rock, Assistant Director of Research
Peg Foran, Administrative Assistant
Bob Hollis

I N D E X

CHAIRMAN WRIGHT: Today the House Select Committee will address itself to matters involving the physical aspects of the incident at TMI, particularly radiation and the effects on health.

With us today are Dr. Gordon K. MacLeod, M-A-C-L-E-O-D, Secretary of Health; Mr. Thomas Gerusky, Director of the Bureau of Radiation Protection of the Department of Environmental Resources; Dr. Fred Rapp, Associate Provost and Dean, Department of Microbiology, Hershey Medical Center; and Mr. James Elder, Saxton, Pennsylvania.

The Committee intends to limit its inquiry today into the radiation and health and our first witness will be Dr. Gordon K. MacLeod, Secretary of Health. Doctor, would you rise and raise your right hand?

DR. GORDON K. MacLEOD, called as a witness, being duly sworn by Chairman Wright, testified as follows:

CHAIRMAN WRIGHT: I believe you have a statement you would like to make to the Committee.

DR. MacLEOD: Thank you, Mr. Chairman, members of the Committee. I thank you for the opportunity to be here today to offer my observations on the sequence of events relative to the accident at Three Mile Island.

I should like to thank that your invitation reflects a concern on your part for the health impacts of the accident.

And I commend you for that concern.

Permit me a few introductory remarks before getting into a discussion of our department's activities following the TMI accident.

My one overriding observation throughout the sequelae of TMI is that the real issue -- the threat posed to the health of hundreds of thousands of residents of this area -- has been virtually ignored by many in official positions.

Certainly those of us directly involved with public health see the importance of looking closely at the health impacts -- both the real and the threatened impacts -- of TMI.

But once you step outside health circles, it seems that other concerns take center stage.

We read of engineering studies and logistics studies and studies on the economic impacts of TMI, and studies on virtually every other subject related to TMI.

But just because we didn't have an explosion, because we didn't have people in hospitals with radiation sickness, there are those who tend to write off TMI as an unfortunate accident from a health standpoint.

Instead, we should be accepting TMI as a valuable lesson that can, if learned well, help to avert adverse health effects of future nuclear accidents.

I cite as only one specific the matter of potassium iodide, a proven protection against the accumulation of dangerous radioactive materials by the thyroid gland.

Gentlemen, I must impress upon you that potassium, in the form of an iodide or possibly an iodate, is really the only medicine that has proven to be an effective preventive agent against one of the long term harmful effects of radioactivity.

But had we experienced the massive fallout that many people feared would result from the TMI accident in the first few days, we would have been without this important medicine.

Sadder yet to say, we still don't have any supply of potassium iodide to be used in the event of another nuclear accident.

And as we learned from the traffic accident involving the truck carrying uranium in Bedford County just last week, the odds aren't as long as we thought they were against the occurrence of other accidents involving radioactive materials.

I must add here that the United States Food and Drug Administration within HEW, in a statement in the

December 15, 1978 Federal Register, acknowledged potassium iodide as a proven agent for blocking the accumulation of radioactive iodides in the thyroid gland.

The National Council on Radiation Protection and Measurement, the NCRP so-called, endorsed potassium iodide for thyroid blocking purposes in a report issued August 1, 1977.

And as early as December, 1975, the Federal General Services Administration, GSA, delegated to the US Department of Health, Education and Welfare the responsibility for drawing up plans for the stockpiling and distribution of potassium iodide.

That responsibility was assigned at a time when the General Services Administration said, and I quote:

"There is an exceedingly low probability that incidents will occur either in the use of radioactive materials in fixed nuclear facilities or the transportation of those materials."

That so-called exceedingly low probability has now produced two such accidents in Pennsylvania alone in the period of six months.

And still no concrete steps have been taken to my knowledge to stockpile potassium iodide in areas surrounding nuclear plants.

In fact, the entire subject of potassium iodide seems to have been ignored by groups taking testimony relative to TMI, including the President's Commission.

I was astonished to learn from the Chairman of that Commission that the reason the Commission didn't take up this important subject was that they just didn't have the time.

I bring this issue up here at quite some length because I think that if the federal government refuses to take the lead in stockpiling potassium iodide, we in Pennsylvania must at least meet our public health responsibilities to our constituents.

And in order to do that, we will need a strong financial commitment from the Legislature.

I cannot at this time indicate to you what such a stockpiling program would cost, or what are the other variables and considerations with regard to the stockpiling principle, but I can tell you that several pharmaceutical houses have been asked to prepare a cost work-up on a state-by-state basis.

There is another important point that demands airing here.

Our primary public health concern from the very onset of the accident, was to reduce to a minimum any threat of stress or panic that we are convinced would have resulted from

any precipitous actions.

Now, as you know, there has been much discussion as to whether the Governor should have ordered a mass evacuation of the area surroudning Three Mile Isand. An evacuation was not ordered.

And there has been much discussion as to the wisdom of rec mmending the removal of pregnant women and pre-school children from the area, which recommendation the Governor did, in part, make on the advice from the Department of Health.

On the one hand, the mass evacuation was not ordered because of our concern for the panic that such an order would precipitate. I shudder to think of the harm that could have been done from such an order.

The recommendation that pregnant women and pre-school children be removed was the most cautious step that could have been taken in view of our lack of real immediate expertise on the health effects of even minimal radiation on pregnant women and young children.

My point in bringing these two issues up is this:

From a health standpoint, we are just beginning to learn how to react to such an emergency.

And we are about to learn a lot more through a

series of health research studies that are being coordinated by the Department of Health and guided by a panel of nationally known experts.

We need unified support for these studies, not only a vocal recognition of their importance, but active recognition in the form of adequate financing.

Specifically, we now face an immediate shortfall of $515,000 in our funding of five of the eight very important research projects we have undertaken into the health impacts of TMI.

And that shortfall covers only the current fiscal year.

The total cost of the five projects not yet totally funded is $936,000. Of that total, we have covered $421,000 with funds from the Electric Power Research Institute and the federal Department of Health, Education and Welfare.

We have received no state funds other than our operating funds to offset the costs of these very important studies.

Yesterday, I submitted a request to Lt. Governor Scranton asking that he and the Governor use their good offices to seek legislative appropriations to cover the $515,000 shortfall of which I speak.

I urge you to give this matter your closest attention when it comes before the House of Representatives.

I hasten to add that there will be additional research costs included in our budgetary requests for 1980-81.

The exact amount of that request will be contingent upon the amount of outside funding we can obtain.

We need the same priority commitment that has been paid to non-health impacts of the accident.

For until these studies are complete, our store of knowledge relative to nuclear accidents will be lacking.

And the inevitable result will be that in some subsequent accident, public officials will again be required to respond virtually by intuition to the threat of immediate catastrophe.

Gentlemen, again I commend you for your obvious concern with the health impacts of the TMI accident, and I urge your continued attention to this singularly more important aspect of that accident.

Earlier, my office of legislative counsel forwarded to each of you an extensive printed piece that summarizes the day-to-day, minute-by-minute activities in the Department of Health as we attempted to marshall our somewhat meager and scattered resources for the business of protecting the public's

health in the aftermath of TMI.

I have brought additional copies of that document with me today for anyone who may need it.

This printed piece is really a digest of four other documents:

My oral deposition taken by the President's Commission on the Accident at Three Mile Island;

Notes from my diary;

A summary of minutes of meetings relative to health studies;

And my working paper relative to the decision of the Department of Health and the Governor not to distribute potassium iodide once it was available, beginning four days after the actual accident.

I am not going to belabor you with a verbalization of all the details in that digest.

I would, however, urge you to study the digest at your earliest possible opportunity.

And I will be happy to provide immediately any of the original materials from which the digest was prepared.

In view of our budget limitations, I am loathe to prepare copies until there be a demand for them.

As you may know, I had been sworn in as Secretary of

Health just 12 days prior to the accident.

I was, consequently, still in the process of orienting myself to the position, the department's functions and the personnel.

I think I should point out here that I had no Deputy Secretary for Programs, no Chief Legal Counsel and no personal staff at the time of the accident at TMI. In fact, I didn't have a Deputy Secretary for Administration. He joined the staff the day after the accident. However, I had been in discussions with him at the time of the accident.

Both Mr. Welch and Dr. Neil Wald, a University of Pittsburgh expert on radiation health, whom I had invited at the outset of the accident, to serve on a consultant basis, were of enormous value.

And it is to the everlasting credit of these two men, and a good many others who stepped in to fill the breach, that we began to get a solid grasp of the situation almost immediately after the accident.

Their work stands out even more when you consider our virtual lack of resources.

We had no medical-health library. That had been dismantled two years previously out of a budgetary concern.

We had no Division of Radiological Health. That

was in the Department of Ervironmental Resources.

We had no Division of Occupational Health. That was also in DER.

We had no preplanned strategy for dealing with such a momentous event.

We were, in fact, a Health Department not equipped to deal with the single most significant public health problem that this state has experienced in modern times.

But with round-the-clock work sessions, the cooperation we received from other state agencies, and the on-site help of representatives of the federal government, we were able to control the situation.

In this case, control meant remaining cool, planning for the worst possible contingencies and taking cautious action, only when such action was warranted by the evidence at hand.

Gentlemen, I think it is important that you know that your Department of Health, and I as the new Secretary, were on top of the TMI situation as well as any organization could have been from the very beginning.

From the time I received first word of the accident at about 8:30 in the morning on March 28th from my Bureau of Health Communications, I was in constant contact with various

health related agencies and experts throughout state government, either in person or through continuing telephone communications.

And I think it is to the credit of those people I was working with that we succeeded in our immediate mission, conveying to the general public an attitude of restraint and caution in the face of a possible catastrophe.

We ask you now to allow us to pursue our long-range mission, that of studying the health impacts stemming from the accident, the possible health impacts of low level radiation, and making sound preparation to avoid adverse health effects of any future similar accident.

Thank you and I will be happy to respond to any questions you may have, Mr. Chairman, members of the Committee.

BY CHAIRMAN WRIGHT:

Q Thank you, Doctor. Relative to your discussion of potassium iodide, it was my understanding that a supply was on hand. Can you elaborate, give us some details as to how that was acquired; where it came from; where it was stored? I believe there was a decision between you and DER with regards to the possible distribution. Now, I get the feeling that that supply is no longer on hand and why is it not on hand and do you have any comments to make on the life of it and where it should be stored and things relative to that?

A Let me try to summarize the events surrounding the request and delivery of potassium iodide. The Bureau of Radiation Health had, over the year or two prior to the accident, been in negotiation with the federal government to receive potassium iodide and to have it available as a stockpile. Such an action was not forthcoming because of the number of bureaucratic problems that existed at the federal level and as well, possibly, because of communications between and among various agencies of state government. However, there was a distinct and concerted effort made by the Bureau of Radiation Health to obtain this agent and the FDA was not in a position to provide it.

After the accident occurred, some two days later, DHEW and the Bureau of Radiation Health were in contact and an agreement was reached to have potassium iodide shipped into the Harrisburg area.

The morning after that agreement was made, the Secretary of DER; Tom Gerusky, Bureau Director of the Bureau of Radiation Health; myself and my deputy met over in the offices of PMEA and the Department of Health agreed to accept the responsibility for the receipt of this drug and any possible distribution plans that might be implemented, might even be needed.

The first shipment of the drug arrived on April 1st,

four days after the accident. Probably some two days after the most intense release of radiation, on Friday the 30th. The drug itself is effective, most effective, when administered prior to the release of radiation but is still effective for up to 12 hours subsequent to the actual exposure to radiation.

Having received the first shipment on April 1st, some 11,000 vials arrived. Six thousand of these were unlabeled. There were obvious discrepancies in the size of the vial and the size of the droppers so that the droppers did not fit in the vials. There were discrepancies in the size of the outlet, the droppers, the drop size themselves so they didn't comply with the standard recommended dosages. There were floaters. There were evidences of dirty bottles, all of which were of concern to the Department of Health in any possible distribution plan than would be made with this impromptu shipment. DHEW had put together an emergency plan and had made arrangements with a manufacturer of the drug in Illinois to have the drug prepared immediately and to be shipped out into Harrisburg under an emergency situation. In fact, this part was accomplished and I think we did have, as a back up, the availability of the drug if, in case, there was actually indicated a need.

As soon as we made the agreement with DER to accept the responsibilities for the receipt. storage, administration

and possible deployment of the drug as indicated, we began to put together a contingency plan and we met for several hours on Saturday and on Sunday and that plan has reached a state of at least relative refinement and is actually one of the documents that we could make available to the Committee if you were so interested. I mentioned that in my situation report which we did send to the members of the Committee.

The drug was stored in a warehouse just north of the department and because of some anxiety about the availability of the drug, we had to keep it under armed guard because people did, in fact, want to get into the drug. However, the best medical advice we had at the time, which was not only from my own self but also from international and national consultants whom we contacted, we that there was no indication for an immediate administration of the drug. Both Dr. Sanger (phonetic) from the University of Cincinnatti, who had been on the Denton Commission, who had worked with Harold Denton, I should say, on the NCRP Commission and Dr. Neil Wald submitted a report to the Department of Health stating that that was their considered judgment. However, on April 3rd, we received a memorandum from the Secretary of the Department of Health, Education and Welfare, Secretary Joseph Califano, who recommended in the first instance that we consider or he recommended that

we administer the drug to all people at the site of Three Mile Island and that we distribute the drug to everybody within a ten-mile radius of Three Mile Island. It was our considered opinion, again, that this was not indicated because, first of all, the levels of radiation were nowhere near the 10,000 millirem exposure that had been acknowledged as the level for the distribution and administration of the drug. In fact, it was less than one-tenth of one percent of that. There was also a serious concern that since this was on, I believe it was on Monday -- Tuesday, April 3rd that we received this memorandum from the White House. This was a memorandum from Secretary Califano to the White House; that the present state of mind and behavior of the populace in the area was such that if we were to distribute little brown vials of potassium iodide, that it might be their impression that there was a greater danger than actually existed. And our third concern was that we may have created a swine flu situation whereby we would have administered a drug for a disease that would never occur and if we had, in fact, exposed people, there is a small incidence of side effect, adverse side effect, from the drug. And so we were aware that this could have, in fact, produced a problem.

I communicated this in a letter to the, a return letter to an article which appeared in the Washington Post on

April 4th, citing health officials in the Commonwealth of Pennsylvania for not having administered the drug and it was published in the Washington Post, I believe, on the 13th of April.

I think in summary, the lessons that we learned, the awareness that we have with regard to dose levels, with regard to contingency plans and the fact that the drug does have an unusually stable shelf life, that we could use this drug, we would be well advised to consider planning and the use of this drug on a stockpiling basis and have it available for the various nuclear reactor sites in Pennsylvania.

Q Where is this supply now that was delivered?

A The supply as delivered was returned to DHEW and I believe it's stored in Arkansas.

Q I gather from your comments the drug was of questionable quality?

A Certainly, the presentation of the drug, I think, left something to be desired. The National Council on Radiation Protection recommended that tablets be distributed but because of the emergency nature of this situation, a saturated solution of potassium iodide was prepared instantly because, apparently, DHEW could not find a large enough supply of tablets. The protection rendered by having that drug available at this time

is now of any great consequence in view of the fact that the emergency situation that relates to the TMI accident had essentially subsided and we didn't release that drug for return until some several weeks after the accident.

Q I'm assuming from your comments that the responsibility or the apparent responsibility for ordering the drug to be manufactured and distributed and stored might be HEW's in Washington. Have they subsequently, subsequent to the accident, in anticipation of another emergency at some place within the United States, have they ordered a supply?

A Well, my concern is registered here before this Committee because I have made these points repeatedly and I think there has been no real reception for them. I raised them in my sworn deposition for the Presidential Commission in some detail and the Commission chose not to raise the issue and advised me so before I testified on August 2nd. I was told that the one area that they were not going to discuss was potassium iodid and that was of some considerable concern to me. They were going to look at the public health education and professional education concerning which I raised but not this particular issue.

Subsequent to that time, I've heard from the Chairman of that Commission whom I have c rresponded with, that

they didn't have time to get into that issue.

Q Has the point been raised with HEW?

A Through correspondence with the Chairman of the Commission, I have sent a copy of that same letter to the Secretary of HEW.

Q Have you had a response?

A I haven't had a response from HEW.

Q I then assume, to the best of our knowledge, there is no supply of potassium iodide in the country?

A That is correct, at least for this particular purpose available at a stockpile basis around nuclear reactor sites. Now, there may be some small supplies at the sites themselves under Nuclear Regulatory Commission requirements but this would not be for the populace in the area surrounding a nuclear reactor site.

Q Do we know why?

A I don't know the answer to that except it is perhaps, in the larger construct of things, that which happens after the accident and we have never had, as far as we know, a significant number of deaths, at least in the short term we've had none, from a nuclear accident. And I presume it's, again, the concern that people in the field of public health continue to raise, that preventive medicine doesn't have a very high priority

in the scheme of things but were this accident to have reached the point of actual radiation exposure to the population, I think we would be well along in some sort of a preparatory effort to have a drug of this sort available. I think the opportunity to have this kind of a drug available would stimulate the same kind of a preventive approach with respect to other dangerous radioactive accidents.

Q Can you give us parameters quantitatively regarding a desirable supply and the cost of same and the numbers of people that might be protected for each nuclear site?

A I think in general the recommended dose by the National Council on Radiation Protection is for a 300 milligram tablet to be taken once a day for each of ten days. That would be multiplied by the number of people who were in an exposure area. In the NCRP report this is estimated to be five miles. This might be subject to review at this time in view of the experience we had with the Three Mile Island accident and I'm not trying to determine the actual range of exposure and the dangerous level areas but I think that this is the kind of consideration that has to be carried, where review and study has to be carried on.

Q Has anybody estimated the cost per se?

A It's a relatively low expensive -- it's a drug

of relatively low expense. I don't know if any type of cost determination has been made.

Q What's the life of the drug?

A It's a stable drug. It has been -- the shelf life would be a relatively long period of time. I think it's another factor that has to be considered. Stockpiling of any agent is always -- has major financial implications that your questions indicate, Mr. Chairman, and I think that we have to get the best possible information on that. But the drug is stable and certainly within the framework of months to years, we could count on the availability of having the drug available but I would be concerned and would want to determine whether a ten, 15, 20 years shelf life is possible.

Q If such a supply was determined to be needed and desirable at each nuclear site, give us some suggestions in regards to where that storage site should be. I assume it should be off site someplace. Should it be within the five-mile area; should it be stored by state government or should it be stored by some pharmaceutical distributor in the area? Do you have any thoughts on that?

A Well, we develped a deployment plan with respect to the distribution during the accident and this information is available. We considered using all of the various sites and we

had designated approximately 40 or 50 sites within the five-mile radius to have it available. Others have suggested the possibility if we were to be going through a national effort or even a statewide effort, that we might want to make it available gratis at post offices, pharmacies, fire stations, at police stations, because, as I indicated, it is a drug that is best taken as a preventive agent and it blocks the action, the uptake, of the radioactive material in the thyroid gland. The radioactive iodine is picked up by the thyroid gland and if it lands there, if it actually attaches to the receptor sites in the thyroid gland, the gland is destroyed in the course of the next weeks to a month and a person then really has no thyroid function which is essential for normal existence. There is -- it's a medically known phenomenon that it's used for people who have over-active thyroids but these people must subsequently have thyroid replacement by taking tablets. So, there is even that aspect of it that could be considered if we consider the possibility of an accident destroying thyroid glands; we are going to have to consider the possibility of having thyroid available in order to replace the damage thyroid glands that would occur during a nuclear accident.

Q Does the administration of this drug require close medical supervision or, to put it another way, is there

any fear that people who are in a semi-panic condition would take an overdose and would there be any bad effects of taking an overdose, thinking some people would feel that if they took three times as much, the problem would go away at one-third the time?

A Well, the dose that is required to block the uptake of the radioactive material is two drops if you are using the saturated solution form and one tablet if you are taking the pill. I think appropriate instructions and labeling is very important and it was one of our concerns, of course, that 6,000 vials arrived unlabeled. We did put our staff to work on that the day after we received it and we got those vials labeled so that we would have them prepared for distribution.

The drug, in terms of overdose, is not known as a toxic agent. It's a relatively safe drug at that level and so, again, knowing that all drugs cause adverse reactions, but I don't know of any major complications from an overdose of a saturated solution of potassium iodide. My guess is that it would be excreted through the normal excretory passages.

CHAIRMAN WRIGHT: Representative Reed?

BY REPRESENTATIVE REED:

Q Mr. Secretary, what studies are in jeopardy as a result of the present unavailability of the $515,000 to which

you referred in your opening remarks?

A We are presently undertaking a series of studies that are interrelated. They relate to the effects of the Three Mile Accident on the unborn fetus, those people who were exposed to that. We are doing long term studies. We are also studying the effects on the thyroid gland. We're involved in the impact, the health-economic effect, of this particular accident. We are also preparing for studies that relate to the long term effects of low dose radiation, low dose exposure to radiation. We have three or four other studies that are currently under way; one of examining the behavioral changes that occurred, both in the population and also in the providers that occurred in the Three Mile Island accident. I believe we have one or two other studies. Our total budget has been put together through various bits and pieces, as I have described; support from the Department of Health, Education and Welfare; also, in kind support from the Center for Disease Control, from the Department of Health, Education and Welfare as well as our own staff commitments and times, as well as a grant from the Electric Power Research Institute which is a voluntary nonprofit foundation that devotes some resources to the effects of nuclear --

Q O.K. You made reference to the study on the long

term effects of low level radiation which is another way of saying that we really don't know at this point what the effects of low level radiation are for a long period of time. Is that correct?

A That is correct, sir.

Q Where did you get your information that during the first critical ten days of the TMI accident, concerning the amount of radiation which the off-site population would have been exposed?

A I was part of the daily briefings that took place in the Governor's office with Harold Denton.

Q And who was it that presented to you or in those meetings or from any other source at any other time the levels of radiation that had been detected or was there, in fact, an absence of information concerning the radiation to which the local population may have been exposed?

A I think we had fairly good data on a continuing basis during those ten days of briefing. Not only were the NRC people here but also representatives of the Department of Environmental Resources were accumulating data. There were some shortfalls and I would have to point out that during a period of a day or two, we were sometimes unaware of the exact levels of exposure. However, at no time was the order of

magnitude sufficiently great to invoke any sort of precipitous action on the part of the state.

Q Subsequent to April the 4th, I believe was the date you mentioned in your testimony, you made arrangements with the manufacturer in Illinois of potassium iodide to have that drug ready for transportation here, if necessary?

A That was March 30th.

Q March 30th.

A But it didn't arrive until April 1st.

Q I see. Is that the shipment that HEW got together for you, sir?

A That's correct, sir.

Q In other words, the Illinois manufacturer of potassium iodide was exactly the same shipment that HEW arranged for?

A And actually it was HEW that precipitated that order. They actually put the order in and we received it as a result of that. We didn't actually negotiate with the naufacturer itself. Actually there was a Detroit manufacturer involved, or two.

Q Was that a sufficient quantity which was received in the event it was necessary to be used for at least a three-mile radius?

A There were concerns because of the fact that it was 237,000 vials and, again, if we used the 15-mile radius, some 600,000 individuals were exposed. However, many fewer families and you could perhaps use a factor of 2.7 to 3 to divide into that 600,000 and come up with the number of families and if we were able to distribute them one to a family, it could be handled in that way. However, this is another area that deserves considerable study as to whether you distribute potassium iodide to a family or to an individual.

Q One thing you may want to include in your future preparatory activities would be the fact that by March 30th, the date that the arrangements were in progress for the iodide to be delivered here, you had already had a mass exodus of at least 50,000 people so that if you were going to set up a distribution system, not to be located solely in the immediate area, TMI area, but rather that there be a distribution of the potassium iodide literally all over Pennsylvania and probably to adjoining areas in New Jersey and Maryland since many area residents had already gone there, although they probably wouldn't have been exposed to a certain amount of radiation, although I'm sure it would have been effective. If you have to take it within 12 hours after your exposure, it probably would have been too late anyway.

A Well, I think that warrants study. We have heard informally that local determinations for the availability of potassium iodide have been made subsequent to accidents in Great Britain. We have been in touch with some of the officials in Great Britain and their communication is that it is not available on a national level and if it is available, it's available on a local level and this was following the Winsfield (phonetic) accident of 1957 when there was a much higher level of radiation released to the populace in that area.

Q There has been a lot of discussion about the metallic taste that people around TMI and people on TMI had during those first seven to ten days. It's my understanding that that metallic taste that people got in their mouths was the fact that radioactive iodine that was floating around in the plume of radioactive clouds that was moving around in the area, whichever way the wind was blowing. Is that true?

A I don't know, sir. I've heard many many allegations of complications as a result of the exposure to these very low levels of radioactive iodine. It is my considered opinion that the levels never reached the level where symptommatic observation could be made. However, and I have no further information on it other than the fact that stories have generated like the kind you have mentioned.

Q Does radioactive iodine give a metallic taste in the mouth?

A I don't know, sir.

Q O.K. Thank you.

CHAIRMAN WRIGHT: Representative O'Brien?

BY REPRESENTATIVE O'BRIEN:

Q Mr. Secretary, an NRC official yesterday in a speech in Pittsburgh stated that both DER and NRC has a plan to clean up Three Mile Island. They have the tank and whatever releases would be put out would be within the regulations of both DER, NRC and federal government regulations. My question to you is. Also in his speech he said the reason they are not doing it is because it's a political decision and it may not be made for over three or four years which means that that plant is going to lay there to more or less the people sort of get used to the idea that we are living within an area where there is radioactivity. Is there more harm in letting it lay there or in your judgment, if it's going to be cleaned -- it's not going to go away from us. Do you think it should be cleaned up, if they can do it, within the regulations?

A Although I worked in a prior career as an engineer and I have been interested in this problem from an engineering standpoint, I really have no technical expertise current to

address your question. I think the one area that I would be most concerned about would be that if any such decision were made, that from a health standpoint, we would be prepared for any possible contingency that could arise of an accidental release of radioactivity.

Q Well, could you find out for this Committee some way, somehow, which way is the best decision to be made? What I don't like is that government is sitting back waiting. They know it has to be done. Should it be done now, if they know how to do it, or should they just wait until people settle down and then go in and say now we are going to do it?

A I think it would be unwise not to consider the extraordinary stress to which people in this area have been exposed and that factor should be considered in any deliberation of that kind of a decision, for that kind of a decision. We don't know the impact of the stress but that may have been the major health effect from Three Mille Island and any decisions that are made subsequent to that with respect to Three Mile Island will continue to have that as a residual.

Q Doesn't it make sense to you, and I'm not criticizing you because you don't know because some of the top officials don't know. It has to be cleanred up sometime and the danger is always there as long as it's there and as long

as it's there, the danger of it leaking out is there.

A Well, I think it's fair to say that the accident is not yet over and that we still have a situation that requires attention and concern. The danger of leaking out exists with any kind of a nuclear reactor site, however, and one must be, you know, particularly sensitive and concerned about this. I think those of us who lived through the Three Mile Island accident have changed our positions and our attitudes and our concerns with this regard and it certainly heightened our sensitivity. But I can't speak, I don't think, to the technical aspects of the question which you raise. Although I certainly think that we should be involved in the deliverbations because there are some very important public health and human factors that have to be considered.

Q Do you live within the area of the Three Mile Island?

A Not within the direct area. I live within Harrisburg but I consider that to be within the area that was under consideration during the accident.

Q No further questions.

CHAIRMAN WRIGHT: Representative Hoffel?

BY REPRESENTATIVE HOFFEL:

Q Mr. Secretary, on page 14 of your attached documents,

resource eodcuments, you identify as one of the problems, deficiencies, the lack of knowledge in the community of the resources to respond to the consequences of a nuclear accident, in point number two. You further say that a program of public education on aspects of self-care and protection have now been planned for initiation throughout the state. Could you describe in some detail the steps you are taking to promote this public education?

A The concern, if I can preface that with a brief comment. The concern that I had with regard to this goes back to the early 1950's when I was aware, as many of my fellow students were at that time, that we were living in an atomic age and there was great anxiety among this group as to whether we would survive in an atomic age. Somehow or other the whole issue became quiescent for about 25 years until the Three Mile accident occurred and people just had no sense of the numbers or of what an accident means in terms of exposure. The word millirem arrived in our vocabulary. The fact that we all found out that about 30 or 40 millirems is what a chest x-ray expsure provides; that perhaps no one received more than the equivalent of two or three chest x-rays, far less than they would have received ina gastro-intestinal series, a GI series, for studying the intestinal tract. All of that information was not part of

our knowledge and I think it should have been. Our basic approach though, to answer your question specifically, has been to begin working in this area with the Department of Education and Secretary Scanlon and I have met with a joint committee between the two departments and have recommended that specific health education films and programs be prepared for various age groups within the population. This, again, will require resources and what we have proposed actually is that we address the pre-school children perhaps through a Mr. Rogers type of program, contacting people who have that kind of access; the school age child; the adolescent male is of concern. As he approaches puberty, he is beginning to develop certain hormonal changes and testicular changes which could, in fact, be affected by such an accident. Certainly, the psychological aspect is of concern. The pregnant mother is another target audience that I think we should be concerned about addressing and making them more aware of the relative safety and the dangers that could result from such an accident. Certainly, the working person and a special problem is the geriatric population because while the radiation exposure may not be important physically to that population, certainly the stress and the possibility of evacuation and movement are a very real concern. So, I think we have a number of people that we have to consider. This committee

that is undertaking this activity is actively at work and will be making a specific recommendation including time frames and target date objectives in the near future.

Q What kind of information would you like to see disseminated?

A I believe that there has to be an awareness that we are in an atomic age; that this is an age of possible nuclear accidents. Try as hard as we wish, we can't make the existing 65 to 75 nuclear reactors disappear today. They are operating and they are continuing to be a potential source of danger. I think that there is not anywhere near the possibility of major damage from low level of radiation as was expected and anticipated by the population who existed within the Three Mile Island area and it was simply a lack of knowledge as to what low level radiation exposure means. I'm not trying to belittle in any sense the likelihood that we could have long term cancer effects from low level radiation. I don't think the answer is in on that one yet but I think we should put before the people the present state of knowledge and the lack of knowledge that we have in this area and by so doing, I think we will generate a great deal of activity that could address the research implications of this and come up with something that is going to be meaningful for the American public and

particularly for those of us in Pennsylvania who have lived through this.

Q In addition to information on nuclear power, would you include in this material steps that a family should take should an accident occur? Are you talking of simply informing and educating the public as to the current knowledge of nuclear power or is it also a what to do if there is a crisis?

A Well, I think there are several levels of concern. One is the general level in the population. We have denied, in fact, the potential of danger. These were accidents that weren't likely to occur, according to some people, and they did occur and I think it's very important that we address that population. I think we have to be prepared to disseminate to the public through our Civil Defense or our Emergency Management approaches at the county and the state level the various kinds of programs that you are talking about and get that information out in the public's hands. I think at the same time we need to be prepared and to have the public aware that we, at the governmental level, are addressing emergency plans for such an event and the Department of Health has done that and has actually distributed a disaster plan for a nuclear accident to the PMEA. It's being reviewed by them and we are in the third draft of that particular document now. It will be a continuing

process over a period of time but I think that is also of concern and interest to the public, that there is an active program under way by state government.

Q This Committee was told that there had been efforts made in the past to educate the public, to send out brochures and flyers and so on. There is an advisory committee to DER, an advisory committee to the Bureau of Radiation Cntrol or whatever the name of that is, that squelched the dissemination of that material. It was never really explained to us why the material wasn't distributed. It simply wasn't distributed. What makes you think that you are going to have any more luck working through the Department of Health and the Department of Education in getting the okay to distribute this?

A Well, with regard to the approach that I have just described to you with the Department of Education, we certainly would be using other media than the state government alone. We are talking about movies, films, television in order to make this communication possible. It's a slightly different approach than just distributing pamphlets and handouts. I also think that the reason there might be somewhat more success in this is if there is a new sensitivity and a new awareness as to the importance of such an accident and people are frankly avidly trying to learn as much as they can, even without formal plans,

I would propose and have actually proposed to the Secretary of Education that we might want to incorporate educational programs within the curriculum of various schools and colleges that will make students aware of what is involved in this area and it certainly could be integrated into existing academic activities. I don't think it has to have a whole new set of courses involved but at least an integration of this into the academic activity and perhaps some of the university and educational people who you will be talking to will address that.

Q Well, I certainly support you in your efforts. I think government has made a terrible mistake over the years in downplaying the potentialness of this and I hope you have more success than the state government, ten or 15 years ago, had in trying to get that information out. No further questions, Mr. Chairman.

CHAIRMAN WRIGHT: Representative Klingaman?

BY REPRESENTATIVE KLINGAMAN:

Q Dr. MacLeod, I didn't quite understand your remarks on possible side effects of the use of potassium iodide. Has there been, to your knowledge, sufficient research in the industry to eliminate any fear of the effects of the use of the drug? The old story of the cure being as bad as the disease.

Has that been researched deeply?

A Potassium iodide has normally been used as an expectorant for people who have pulmonary disease and the side effects are known and defined clinically fairly well. It can produce over-activity of the thyroid gland. It can produce a suppression of thyroid activity, not to a dangerous level but it can suppress it. It can have some effect on the fetus in a pregnant woman. It does have a propensity to produce a rather nasty rash. Sometimes that can become very serious but as all drugs go, there is an adverse effect in almost every instance. There is no completely safe drug. Potassium iodide would be considered one of the relatively safe drugs, having a very low frequency of these side effects and ones that lend themselves to reversal with the discontinuation of the drug. So that one returns to a normal state by not taking the drug. If you have one of these complications occur and you're en route to an evacuation procedure which would probably be taking place, you might find yourself outside the danger area, outside the exposure area and could discontinue the use of the drug and, therefore, not have the consequences of such an adverse effect. I think there is only one other point that I should mention because in one reference where we did research the literature fairly much, there was a concern that the potassium aspect in

some elderly patients could produce arrhythmias of the heart. This is not in younger patients but it's the only single serious consequence that I have been able to find out and, in fact, may be affected by another preparation. I think further study of this complication should be considered in any plan to make potassium iodide available or stockpile it.

Q Then, a general distribution of the drug is not entirely without some faults?

A It's exactly the concern that I raise. We shouldn't make the decision arbitrarily to stockpile this but we should study it and to follow the best possible advice that we can get and we do have this very fine report from the National Council on Radiation Protection and it goes into most of these issues that I have raised. However, the decision was made and a recommendation was made that the drug should be stockpiled and available around nuclear reactor sites.

Q On page four you speak of five projects, five study projects being conducted at a cost of $936,000. Are they being done interdepartmentally or arethey being conducted a contract basis, outside contractors?

A These are health studies that are being coordinated by the Health Department. Some of them are being conducted within the department and some are under contract to various universities throughout the state itself. I don't

believe any of them are being conducted by people outside of the state itself.

Q Pardon?

A I don't believe any are being conducted outside, by agencies outside the state.

Q I understand that there are some intrastate contracts?

A That's correct, sir.

Q With the universities, for example?

A I think in every instance they are related to universities, that's correct.

Q Mr. Chairman, I would just make one other observation and that is I'm becoming increasing concerned with the hidden costs of generating electricity and power by nuclear power. I say generating electricity specifically, for example, in Pennsylvania I don't think we are in much danger, let's say, of a nuclear accident aboard a submarine but I'm beginning to feel that these requests that we're hearing by government agencies and departments for more and more money for related services to be provided by government. My thinking is if those costs were to be added to the actual costs of generation, then maybe this process might not be so inexpensive. Thank you, Mr. Chairman.

CHAIRMAN WRIGHT: Representative Lehr?

BY REPRESENTATIVE LEHR:

Q Mr. Secretary, who supplied the filthy vials of potassium iodide?

A Who supplied the vials?

Q Yes.

A They were prepared by a manufacturer in Decatur, Illinois and were shipped from that site.

Q Was anything done about that problem?

A We alerted the Department of Health, Education and Welfare about the quality of the vials. We did send the vials to them for determination of the quality and we received satisfactory responses as to the quality of the drug itself.

Q Thank you.

CHAIRMAN WRIGHT: Representative Schmitt?

BY REPRESENTATIVE SCHMITT:

Q Thank you. Dr. MacLeod, in your report which I think is a very good one you leave several things, I think, the Committee should know about. I think before we write our report, that we must include in that report all of the facts concerning potassium iodide which means its cost and availability; shelf life, because that is an important part in the scheme of things; and how it is to be ingested and whether or

not it will develop like we have in the polio shots, in the liquid and then the solid.

A. Yes.

Q. The thing that concerns me and I think has to be considered because you are going to be the one that has to be faced with it, is that you have a cost factor of your problem of $515,000 in the projects in the State of Pennsylvania which comes to nearly $1 million in research and expense. This, of course, means a budget increase and, of course, a tax increase and I don't think any of us wants to withhold anything in the health nature that might be beneficial to people but I think we must recognize the fact that there are costs involved here for the TMI and they are going to be borne by the taxpayers or the citizens of Pennsylvania, pure and simple. Again, I repeat, if it means the savings of lives and good health, I say that any amount we are taxed is worth it and I will always support good programs such as you, as the head of them. For the life of me, I can't see how proprietary interests like the power company can build a power plant, sometimes over the objections of people, and put a price tag on it. This is, apparently the kind of game we are playing with this particular thing. I think something has to be done about it. I don't think it's fair for proprietary interests to place a tax burden

on the shoulders of the people of Pennsylvania who are already more over-burdened than most of us can bear.

First of all, do you agree with this philosophy I am expounding, before I go on with another question?

A I think there are two things to be said, Representative. One of the first is with regard to research activities, the source of funding can be viewed by some as a complicating factor. If there is any conflict of interest, it could appear that we were beholding or the research activity was beholding to the funding source. And so, from that point of view, we might want to consider the source of funding and, in fact, we have received some $280,000 to do a complete survey of the population within a five-mile radius of Three Mile Island. We did achieve a 98 percent result. We received an additional $80,000 to do the studies on the pregnant mother and we received $200,000 from the Electric Power Research Institute. So, no state money, to date, has been used for that kind of activity. It's been in kind, if you will. It's been staff resources, the time of the staff that has been used. That's where state money has been used. What we are doing is addressing the full compliment of the research that should be undertaken.

With respect to the other aspects of your indicatim

which is the burden of responsibility, I don't think the answer is in yet on who should pay for the stockpiling of potassium iodide. Is that a federal responsibility; is it a state responsibility; is it a company responsibility? The question of conflict or compromise, I don't think, has to be addressed about that particular issue because I think we have appropriate quality control that can be used in order to find the level and the quality of the drug, no matter who paid for it.

Q [illegible].N. I think that's all I have to ask at this time. Thank you, Dr. MacLeod.

CHAIRMAN WRIGHT: Bob Hollis?

BY MR. HOLLIS:

Q Mr. Secretary, I'd like to refer to page four of your testimony and it's concerning the the evacuation and you made a statement, "The mass evacuation was not ordered because of our concern for the panic that such an order would precipitate. I shudder to think of the harm that could have been done from such an order." Just less than a week ago there was a mass evacuation of over half a million people in the Gulf Coast due to a hurricane. There was no panic. There was no stress. People got out. Why do you, in this case, feel there was such a possible panic and future stress on an individual under that type accident versus the oncoming assault of a hurricane with

winds over 120 miles an hour? What's your philosophy?

A I think that speaks to, as one of your colleagues said, and that was the fact that we did have a 50,000 people evacuation spontaneously and that was without any precipitating factor of a governmental nature that called for an evacuation. I think there was another more important factor though and that was that we understand something about a hurricane but we have no idea about the effects of radiation and I think that the low level of panic that existed in everybody that remained in this community, myself not excluded, concerned about and anxious about what was really happening with respect to radiation was unnecessary and unjustified. I think the next time perhaps we won't have quite that level of concern because we have been through it once. I don't think we should be becalmed in any sense but there was a true phenomenon of not knowing, I think, that influenced the decision not to evacuate. There was no, to the best of our knowledge, any level of radiation that was dangerous but nobody knew what a meltdown could really mean to the people of the area.

Q Yes, but the meltdown came into -- there was a supposition that there might be a meltdown. But really it appears that there has been quite a bit of interest, particularly from the Department of Health in your studies, in the psycholo-

gical effects of an accident rather than the actual medical effects. I'm talking about strictly medical vs. the psychological effects.

A Only one of the five studies are addressing behavioral stress.

Q One of the five. In your funding request from the state, why do you feel that the state should pick up the tab? Why should not the federal government be responsible for the studies as to the long range medical effects of this accident due to the fact that regulation of nuclear power in the industry is a federal function and why should Pennsylvania pay for something that should be or is going to be used on a nationwide basis? Why not NRC or one of the federal agencies be the proponent of the funding and the study be conducted in Pennsylvania?

A Well, as I indicated, we have requested and have received federal support in order to begin and to get some of the studies underway and we have sought additional support in order to conduct these studies. However, there is a difference of opinion at the federal level as to whether some of these studies are, in fact, indicated. We have put together a national advisory panel, people with national and international reputations, and by so doing, I think that Pennsylvania can speak more

clearly and more effectively to the need for this research that has to be undertaken in order to understand more about this accident.

Q You think Pennsylvania should pay for it and not the federal government?

A I think my request is to this particular, is to the state in order to obtain the support. If we don't get the support from the federal government, I would ask the state for the support in order to conduct the studies.

Q Thank you.

A And that has been our understanding to date.

CHAIRMAN WARNER: Fred Taylor?

MR. MILLER:

Q Thank you, Mr. Chairman. Dr. MacLeod, I guess I'm the last kind of wrap-up questioner. In your statement you said, "From a health standpoint, we are just beginning to learn how to react to such an emergency. And we are about to learn a lot more through a series of health research studies that are being coordinated by the Department of Health . . ." I guess Central Pennsylvania and the Commonwealth of Pennsylvania and the Government of Pennsylvania, just like Sir Isaac Newton, the apple just hit us on the head. Do you have an ongoing program or are you planning an ongoing program to share the ex-

periences and the studies that you have done as a result of TMI with the other states throughout the nation which have nuclear power plants?

A At the present time, we have not been approached in the health point by the American Public Health Association, by the Commission with regard to the potassium iodide. There has been practically no interest in the health aspect and that's one of my serious concerns and I really bring that point before this Committee because of the absence of this awareness and attention to the health aspect. In my opinion the public health and safety is the most important event related to the accident. But the focus has been so clearly on the engineering aspects and on the logistics of evacuation, both of which I was concerned about and interested in, but the aspect of preventive approaches and research activity that is really going to give us the kind of information so that we are better able and better equipped to handle this kind of an accident in the future has not been forthcoming in the months following the initiation of the accident.

Q Don't you feel it would be worthwhile in the Commonwealth of Pennsylvania for us to initiate a move to share this information with others?

A I think it would be very much in order and we

certainly have not been hesitant ourselves to do it, however, there was a major conference at a nearby university just last week and there wasn't one member of the Health Department invited to speak at that. I think it speaks of the visibility in the Health Department in this particular state.

Q Thank you very much, Mr. Chairman.

CHAIRMAN WRIGHT: Thank you, Dr. MacLeod. Your testimony has both been candid and enlightening and helpful for the committee. At this point, we will take a five minute bread and immediately following the break, Dr. Fred Rapp will be on board.

(The hearing recessed at 11:23 a.m. and reconvened at 11:30 a.m.)

CHAIRMAN WRIGHT: Dr. Rapp, you'll have to raise your right hand.

DR. FRED RAPP, called as a witness, being duly sworn by Chairman Wright, testified as follows:

CHAIRMAN WRIGHT: We have Dr. Fred Rapp, R-A-P-P, Associate Provost and Dean, Department of Microbiology, The Hershey Medical Center. The doctor did visit with us at our hearings in Bainbridge and is back now perhaps to amplify on those remarks; to talk about his experiences at Hershey and

perhaps add to some of the remarks that were made by Dr. MacLeod. You are on, Doctor.

DR. RAPP: Thank you. Perhaps it might be pertinent to this Committee that part of the reason I think I'm here is that I also direct our cancer research efforts and one of the possible problems with nuclear fallout or radiation.

We, at Hershey, were probably the nearest primary hospital to Three Mile Island because we are eight and a half miles away. My own house, it turns out, is two miles behind the Hershey Medical Center and it turns out to be towards the Three Mile Island. So, I was about six and a half miles away and was on the command unit for the Hershey Medical Center to evaluate the evacuation contingency plans. It's fair to point out, I think, that almost every hospital in the country -- in fact, to be accredited, hospitals in the country have to have plans if there was a disaster in the immediate area. What those plans visualize is bringing in large numbers of hurt individuals. For example, in the case of airplane crashes and so on. Those plans do not go in the other direction. That is, an exodus of hospital personnel and the patients and, of course, in a hospital we have very special problems. At the Medical Center it soon became clear that evacuation plans, if they were invoked by the Governor, were going to be extremely difficult

for a number of reasons. There are a fair number of people at any one time on life support systems and any kind of evacuation was fraught with very severe risks to those people.

With respect to children in the neo-natal intensive care unit, we are one of only a few hospitals who have the specialized equipment required to keep them go and very few vehicles have the equipment required to transport them. In fact, at the Medical Center, very early those children were evacuated to Philadelphia hospitals when we determined that the hospitals to which the Medical Center patients were to be evacuated, that is north, did not have the capability for taking care of those children.

During the three-day period from Friday through Sunday, we elected to evacuate most of our ambulatory care patients and not to admit any new patients on selective surgery, plus emergency treatment was supplied.

I should also point out we had to wrestle with the problem of what to do if there was a major catastrophe at Three Mile Island since we were the hospital under contract to take care of any radioactive exposure of their work people there. So that anyone exposed, we were equipped to take care of those people but we were equipped in terms of three or four at a time; certainly, not in terms of dozens.

Dr. MacLeod mentioned potassium iodide stockpile. We had enough potassium iodide for the hospital and its personnel because we always have some available because we work with radioactive iodine all the time and in the case of an accident at the hospital, we need that material and so it's readily available to us. But we certainly don't have available stocks for the general population and didn't have at that time.

However, I think it's fair to point out that potassium iodide protects only the thyroid. It protects the thyroid against damage and it protects the thyroid against, ultimately against cancer from low levels of radiation. It does not protect against the other kinds of illnesses that could result from exposure to various dosages of radiation. It doesn't protect the fetus; it does not protect against breast cancer which is one of the ones that increases after radiation; it does not protect against leukemia. So, it is good for one specific organ site and it's good for that only because the non-radioactive iodine in potassium iodide competes out for the radioactive material and in that sense, protects it. So, we have no way of protecting against the other things by direct and immediate therapy.

I'd like to comment, since I was in Buffalo at the

time of the Three Mile incident and flew back here on Friday as fast as I could, that I have been evacuated during a hurricane and the situation is really quite different. It's different because people living in the Gulf Coast and hurricane areas have or are highly aware of the possibility of hurricane and have a reasonable amount of warning most of the time from the Hurricane Weather Advisory System. Secondly, the people evacuated under those conditions generally are either in houses that border on water; that is, water damage may be a problem; or are in what might be called flimsy constructed houses but the major buildings are generally reasonably hurricane proof. So, hospitals are generally not evacuated. Hospitals and churches, in other areas, become the center of activity for the evacuated people. I think we had quite a different problem here.

Firstly, the population, and that includes the professionals in that population including the professionals at the Hershey Medical Center, were not totally aware of what to do in a case like this. They did not have enough information in general about the problems of radiation, the safe levels and so on, except for very few people, and it's quite another matter to be talking about evacuating your home for the next 50 years, maybe perhaps never to come back, as it is in a

hurrican area where your home may be flattened; you may lose everything; but you can come back to that piece of ground. You are going to come back to the area. So, I think the problems were really rather different.

During the time that we spent talking about evacuation -- we had this committee and this committee met everyday, three and four times, and Dr. Arlen Marler who is the Chief of our Emergency Medical Service was the Chairman of that committee. It had on it a variety of physicians and other personnel including head nursing personnel. But during that time we discussed this, it became increasingly obvious that we probably could not evacuate, with safety, most of the patients. The concept that the state gave us at that time, with communications being very poor, I should point out, that we would move north but that the ambulances would have to come from outlying districts and would have to move south left us in quite a quandry since we really couldn't imagine how the ambulances would leapfrog the cars going north. We had the additional problem of not knowing how many ambulances were available and, in fact, there were not enough available. We had the third problem of wondering whether, in fact, ambulance drivers would drive deliberately into a radiation zone. Another major difference in driving in after a hurricane is exposed

area. And, in fact, there is some reason to believe that we probably would not have seen those -- those people would have been very reluctant to drive into a radiation zone as is based on the number of volunteers that the Red Cross was able to generate for the Hershey Arena. It was very difficult while generally they find it very easy to generate volunteers under catastrophe circumstances.

So, it became rather -- the fourth item which no one had every thought of is herein you are going to evacuate a large number of people and given, let's say, that your points of evacuation is 100 miles north. That takes two hours if you get into a car today and drive north but how long does that take in a sea of people all struggling to escape. In other words, how much life support do you need for each patient. So, every patient became an individual problem and we had to have a medical dossier; do you write prescriptions and everything for a trip we did not know how long it would take. We were quite certain it would take more than two hours.

In the final analysis, after three or four days of wrestling with this problem, we began to conclude that the safest place would be to stay in the hospital. In fact, to take the patients off the top floors, and what had not been

discussed was the fact that there is a considerable amount of protection that is afforded by concrete, earth and so on against radioactive fallout coming from the sky, either by rain or via wind, and that we felt that the concrete barrier at the hospital that its upper floors would supply, given the circumstances, unless there was a massive exposure, would, in fact, be more protective to the patients than removing them under unknown circumstances.

Now, we had no access to other emergency evacuation plans and had to deal with this on a minute by minute basis and, in fact, Dr. Marler and his colleagues are preparing a detailed report and a plan for the future for evacuating the hospital, if necessary, which we hope we will never have to use. I could go into any of the details that we got into at that point but I would like to state one other thing and that is that the medical center remained very very functional. There were some people who weren't there but in the main, we had adequate numbers of physicians. We had adequate nursing care. We had adequate supporting personnel. It turned out that the most important people might have been the switchboard operators and they stayed on their jobs so that at no time was the hospital in any danger of becoming non-functional and, in fact, there was a time when we had released certain patients,

certain numbers of patients, that we had too many nurses, too many residents and too many students for the number of patients available but kept them on duty on the chance that evacuation might be called.

So that Dr. MacLeod's comments about educating the public as well as those professionals within the public, I think, are very good. I think it's a very difficult thing to do because of the many other areas of medical care.

I would like to make just one or two comments about low level radiation and the difficulties with measuring it and the difficulties with measuring its effects. I was one of the people involved in last week's two-day continuing education symposium on some of the aspects of Three Mile Island and nuclear energy and so forth. I must say I apologize to Dr. MacLeod that he wasn't involved. The problem of knowing experimentally what happens with low levels of radiation can be easily summarized in the following example. If you use a large amount of radiation and you eradiate a test animal; let's say a mouse which is very often used, you can get ten out of ten mice to develop tumors, given a large amount of radiation. But we need to know what happens at low levels where perhaps ten out of 100,000 people are affected. And to do that in an experimental system requires 100,000 mice to find ten, given any

given dose of radiation for any given period of time. So, you need millions of animals and the logistics of the study make this very difficult. In fact, for all intents and purposes, make it impossible. So, what people do is they give larger doses and they try to extrapolate down to low doses and this is scientifically, in one sense, a valid thing in many many different experimental systems. It turns out with a low level of radiation, we're not certain how the curves go when you drop below a threshhold level. So, we really don't know, in a sense, what happens with extremely low doses of radiation.

Now, I applaud, I personally applaud as someone who has been involved in cancer research for over 25 years, the fact that Dr. MacLeod has studies to look at the population around Three Mile Island for an extended period of time and I think that needs to be done. But it is perhaps fair to point out that unless an epidemic of a specific kind of cancer appears and this may happen in 20 or 25 years or whenever, any small change in cancer levels in that population will be statistically of no significance because we see this kind of variation in many communities. To give you one example, there is a community in Pennsylvania where eight per hundred thousand children in the right age group will get acute leukemia. Other neighboring

communities, no nuclear plants, nothing we can pinpoint, will have 13 or 14 children per hundred thousand and this varies back and forth from year to year. So, consequently there is a variation in cancer rates and the calculated numbers of increased cancers in the 28,000 population of Three Mile Island is calculated by cancer experts who are radiation experts. For example, Dr. Arthur Upton is presently the Director of the National Cancer Institute and a radiation biology expert. The calculations are that one or two additional cancer cases in that population, based on the amount of radiation released. Now, we don't want any more cases at all but we won't be able to pinpoint those one or two in a sea of about 7,000 expected cases; that is, one in four for all cancers, in that population. So, unless we have the very unfortunate situation where we have a huge upswing in a given kind of cancer, we are probably not going to be able to pin additional cases to the radiation accident that occurred at Three Mile Island. And I think that most of us hope it will turn out that way.

Now, I mentioned to the Committee members that I think I will stop here and try to answer any questions you might have.

BY CHAIRMAN WRIGHT:

Q Thank you very much, Doctor. I liked your remark that probably one of the most important people in the hospital was the telephone switchboard operator because I mentioned to you privately a few moments ago that one of the major problems we had found in talking to anybody and everybody has been in the area of communications.

A I agree. There was a great difficulty.

Q How about giving us some relative guidelines or your people who are involved in cancer research in the hospital are subject to some exposure. How does that compare with backgrounds and how does that then compare or how did the conditions during that weekend of Three Mile Island compare to what your people are exposed to in the hospital?

A O.K. Our people in the hospital who work with radioactive isotopes are all carrying docimeter badges all the time and it might be useful to point out in that context -- I think the question came up before -- where was it monitored and these units, this counting equipment, was all over just hanging from trees and hanging from roof tops. What it wasn't and what they weren't is on the jackets of people. So that the estimates in the air, it's not the same thing that the people get because they are not standing there waiting for it to hit them. They are going to be in and out of houses and so on. So,

our people in the hospital are monitored directly. That is, it's right on their bodies and in any kind of future problem, it might not be a bad idea to think about putting these units on people in the area and actually monitor them directly as the workers at Three Mile Island would be monitored. We monitor these people regularly. We give them, by the way, if they are exposed to radioactive iodine, potassium iodide, as an example. The dosage is higher than the general population. The allowed dosage for those in occupational areas, radiation areas, which is the highest we would see, is 5,000 millirems per year or no more than 3,000 millirems per any quarter. None of our people get anywhere near that. We are talking about less than 100 millirems. On a yearly basis we would have very few people with 1,000 millrems per year. That would be very rare to have that much.

We also, however, monitor all of our laboratories on a routine basis. That is, our Health Physics people monitor our laboratories on a routine basis to look for spills. That is, ay radiation spills that have not been reported or have gone undetected. And those spills then have to be cleaned up immediately. So that we are looking at considerably more than the one to two millirems that the average individual might have been exposed to in that area and even more than the 84

millirems which was the highest level of exposure reputed to be, based on the information given to us by the nuclear regulatory agency and so on. But we are looking at less than the higher limit which is 3,000 per calendar quarter or 5,000 per year. On an average, you are looking at considerably less than 30 millirems per year actually.

Q We talk about 5,000 millirems per year, 3,000 in a quarter. I think we have heard similar statistics from the operating people and the engineering people associated with NRC and Three Mile Island. A concern was raised here a while back and it's still not clear in my mind. Assuing the quarter is January, February and March --

A It's calendar.

Q You can have 3,000 millirems by the last day in March. Do you start from scratch again on the first day in April?

A Basically, that's right, but you can only have 2,000 more. Then, the 5,000 is through for the year. You can't have 3,000 again in the second quarter of the calendar year. In other words, 5,000 is the ceiling for the year. But, of course, you raise a good issue. It is better to spread it out longer than it is to get it concentrate at one time. But, again, I think we should keep in mind that you don't get

radiation illness symptoms until you are way way beyond that. But there are, of course, effects below radiation illness dosages. I think the radiation threshhold is somewhere around 100,000 millirems but I don't want to be held to that. You do get it because what happens is that radiation, in a sense, causes chromosone breaks and those chromozone breaks, if they they are repaired, if they are repaired incorrectly, you can have damage and this is why cells that are divided are more at risk to radiation damage. This is why the fetus is more at risk to radiation damage than an older person. This is why leukemia is a bigger problem because we are looking at bone marrow cells that have a tendency to divide and, therefore, are a greater risk to damage again than those in a younger person and an older person. So, even 3,000 to 5,000 millirems in a susceptible individual, and there are variations in individuals' susceptibility to radiation damage, is not something that I would want to come face to face with on a yearly basis.

Q Talking about docimeters, it's one thing to wear a badge on your chest and that in itself, I would assume, doesn't provide any protection. It takes somebody to read those and keep a record. Am I assuming that when you buy a badge, you are also buying a service with the badge?

A That's right. Our badges are constantly monitored.

We buy the badges but they are monitored by our own Health Physics people.

Q By your own?

A Our own Health Physics people. In that connection, we have put all of the counting equipment around the Medical Center on the roof top and around the Medical Center and for research purposes, we have a fair amount of counting equipment there and we did not see an increase eight and a half miles away from Three Mile Island of measured radiation in the atmosphere as measured by our own counting equipment. This, of course, depends to some extent on the wind. It could blow two miles north of us or south of us and we wouldn't be picking it up.

Q Is there any centraly -- I assume you are keeping an in-house history?

(Dr. Rapp indicated in the affirmative.)

Q On your own employes?

A Yes.

Q Is there any central agency that, at the federal government level, or otherwise who keep a national data bank and maybe I should my question a little more specifically. You hired a new employe from another research center. How do you know what the history of that employe is prior to coming to

or, and conversely, when he leaves you to go with somebody else, does the history follow?

A Not really. It's a loophole in the system. As a matter of fact, we could get his history by calling up his previous place of employment and if they keep good records, and assuming he was in some kind of industry or in a laboratory that utilized radioactive isotopes. In fact, this problem came up last week in our symposium. How do you deal with itinerant workers, mechanics, welders, who sort of travel around from one place to another for jobs. They may come to Three Mile Island from somewhere else or they may go from Three Mile Island to somewhere else? In fact, in fairness, I don't think this is known. There is no central information pool that one could draw upon for those histories at this point that I'm aware of. For our hospital people, we don't have that from other sources.

CHAIRMAN WRIGHT: Representative Reed?

BY REPRESENTATIVE REED:

Q I'm curious with regard to the conference that you referred to and the Health Secretary referred to where the impact of radiation was discussed. Were any of the patients, any of the persons who have exhibited symptoms of radiation sickness since the TMI accident, were they, in fact, interviewed;

have they been diagnosed or were your conclusions with regard to the effect of TMI radiation level concluded on the basis of previous studies?

A Well, we have not seen any patients that I'm aware of in the hospital with real radiation illness. We did not see the people who were over-exposed; that is, the workers at Three Mile Island because they were sent elsewhere because we felt it was more safe to do that. I should, however, point out that people who complain of radiation illness, I think you have to keep in mind that the symptoms of radiation illness are very vague. They very often resemble the common cold and many other gastro-intestinal disorders, a little nausea, a little fever. And there really was nowhere near, to the best of our knowledge, the amount of radiation to call for symptommatic radiation illness. So, at least at our hospital, our physicians tell me -- we discussed it just a few days ago -- that they saw no one that they could pinpoint with radiation illness. It is true that there were people who complained of symptoms that they felt were like radiation illness. Incidentally, by the time you have radiation illness, you also have -- you generally have blood abnormalities and so on because you have a depression of certain kinds of cells that can be detected on tests and so on and we simply have not been able, in our hospital, to pin-

point anything back to radiation illness, although we had some people who complained of that.

CHAIRMAN WRIGHT: Representative O'Brien?

BY REPRESENTATIVE O'BRIEN:

Q Doctor, taking up where Chairman Wright was asking you questions about radiation, I believe when you appeared before the Committee down there, you made the statement that you were concerned about the amount of radiation in the area and that is why I wanted to get you back here. You go back to the hospital -- now, my sister works for the VA hospital and she got cancer. Why can't I say that she got cancer in the hospital during the years she worked there, 30 years in the hospital and was around radiation and everything else?

A Well, let me -- I don't know whether I can answer that directly. I don't know if I can say if she did or she did not because we really don't know very much about specific causation or radiology in cancer. If she was an x-ray technician, for example, there is no doubt that in the earlier days there was an increased incidence of certain kinds of cancers in radiologists themselves, the physicians and their staffs, who dealt with x-ray machinery, who weren't protected enough. So, it depends, to some extent, on what your sister worked at

and what job she was at. But there is no sort of radiation floating loosely around the hospital. It would depend on what her job was really.

Q Doctor, when you made the statement that you don't know if someone in the Three Mile Island, five years from now or ten years from noe, maybe one out of a thousand has cancer; would you say that you know or you don't know?

A I would say that if one per thousand, which is an increase of about ten fold is what you are saying because usually you are looking at about ten per hundred thousand but one per thousand; now, you're increasing that by ten fold and now you are going down to an incidence of one per thousand. Do I understand that correctly? Is that what you are asking?

(Representative O'Brien indicated in the affirmative.)

A In that general region and not further away in adjoining regions, I would say that would be, it would be at least a very strong suggestion that these people, all exposed to the same thing, that Three Mile Island might be the culprit, yes, if you have that kind of an increase. But if you have in that population now 28,000 people and you have one per thousand, one per thousand gives you one per 280 --

Q My --

A That's very high.

Q I only threw the figure out. Let's go back to hospitals.

A Okay.

Q The medical association, have they done a study about how many employes working in a hospital have cancer over the years, percentage wise?

A There are figures for that, yes.

Q Can you get this Committee those figures?

A Yes.

Q I'd like to get that and I'd like to see whether the fact that there is more radiation today than they had in other years, and I want it by years, to see if there is an increase because I don't know. I can't find anybody else and I was amazed at some of the statements that you made down there and that's why I was anxious to get you back. What is an overdose in your judgment, and you are connected with radiation? What is your title?

A My title?

Q Yes.

A I'm Associate Provost and Dean for Health Affairs. I'm Chairman of the Department of Microbiology and I am the Director of the Cancer Research Center.

Q How much knowledge do you have in radiation itself?

A Actually, most of this has relatively little. The only reason I have some knowledge about radiation is because of the fact that radiation is one of the things we use more or less routinely to look at cancer causation in experimental systems; because I have been involved in many meetings, symposiums, with people in that area and so on.

Q Getting back to my sister, she is being treated with radiation to curb the cancer.

A Right.

Q Now, how about the people in that room, the employes in that room, you know? She lost her hair and everything else because of the treatment.

A She's getting concentrated radiation to a specific site, assuming she is not getting whole body radiation. The employes in that room have been well trained and are being highly protected against that kind of radiation level obviously and I don't know about the employes. I don't know about the particular hospital but I assume there are regulations that protect their employes. You are asking what happens if the employes are exposed to low levels of radiation and that's the question I'll have to try to raise. Keep in mind those figures for hospitals, over the years, have changed for a number of variables. First, we are perhaps using more radia-

tion but we are protecting people better against it. There is a certain amount of background radiation in our environment all the time. When you ask me what is safe, I would have to respond to that by telling you that individuals vary in susceptibility to any given cancer causing agent because of their genetic background. Some individual's chromosones, for example, are broken more readily than others which puts them in a higher risk.

Q Wouldn't that be true if I was living in Denver -- because of my physical condition, that I would be subject to cancer?

A In theory that is true. That is, there is about two times as much radiation in the Denver area at that altitude. In practice, the cancer incidence in Denver is not any higher than the cancer incidence at levels below where you have half the cancer incidence. Now, you see, you run into other problems and that is another area may be more polluted. The northeast United States is much lower -- it's closer to sea level but there is quite a bit more pollution and many more pollutants may be involved in cancer causation.

Q Do you think DER and NRC were giving the right figures out when they were monitoring the low radiation around the Three Mile Island?

A Well, my guess is as good as anyone's. I would rather hope that those figures are true figures.

Q Were you satisfied with the figures that came out of there, that it was low radiation?

A At the time of the incident, we were not satisfied with the kind of information we were receiving and it developed a fairly large credibility gap. Since that time, with a little evaluation of the figures, I think I would believe Dr. Denton's figures for the amounts that came out. Keep in mind, this is an average amount subject to movement of air, subject to where you happen to be at any one time. So, again, we are speaking of averages.

Q How far is Hershey from Three Mile Island?

A The Medical Center is eight and a half miles north. The Arena where the pregnant mothers were put is just outside the town.

Q You have machines over there that you were taking your own --

A Yes.

Q What did your own tests show?

A It did not show any increase over background but remember, that depends on wind direction. If the wind were taking it elsewhere, we would not see anything over background.

Q At anytime the wind was blowing your way, did it show any --

A No. At no time did our monitoring devices show an increase over background.

Q Then, why were you concerned?

A Well, for one thing, we were concerned because the amount the plant itself, the core, was still hot and at anytime there might have been a hydrogen bubble explosion opening up the area to very large amounts. There might have been a meltdown which would have released large amounts into either the atmosphere, into the river and then into the atmosphere. We had no prediction, no way to demonstrate which way the wind was going. Until that plant was secured, at any moment very large amounts of radiation might have come our way.

Q We are all concerned on what was going to happen to the plant but the fact remains you had more radiation in the hospital than your monitoring machines showed you had outside; am I right or wrong?

A No. The hospital is like the background. We had radiation in the hospital only in the areas we are working with it. In the general hospital air, we have background radiation which is the level we generally see all of the time as you would see in this room at this time. We did not have an

increase in that particular level. We also were concerned because we had 330 patients, approximately 330 patients in the hospital who we were responsible for and the surrounding community who look to the hospital for leadership in medical care. I think all of us were very deeply concerned in the general community area and we were especially concerned because we had a population that we could not evacuate easily. They were not ambulatory.

Q We are all concerned but I was concerned about the statements you made down there and I'm concerned whether you feel that DER was doing their job and NRC was doing their job because you felt, at that time, you didn't know.

A In the early days of that incident, my guess is that the communications breakdown was so great that obviously the job wasn't being well done. I think it's hard to pinpoint. In fact, Dr. Denton mentioned last week he was trying to get information in Washington and then evaluate that back up here and it was almost impossible and he finally had to come to the scene to do it; recognition of the fact that the information he was getting, that the way it was being presented, the way the whole communications network was down, that it was not very effective and obviously that added to the growing concern in the general population and that of our hospital, medical staff.

Q I live in Wilkes Barre and I got on my news reports what NRC thought and what DER thought the radiation was in that area. Why wouldn't you get it in Hershey?

A We got those figures in Hershey, probably the same figures that you saw but the, in watching the television and I must say, having lived through that, it was especially alarming if you were right in the center of the storm, so to speak, in the eye of the storm; that watching the various individuals on television and seeing the incomplete plans or the non-existent plans for how to deal with this on a catastrophe basis, on a very rapid basis, concerned us very deeply. Had I been living --

Q Incomplete plans on what?

A There were, for example, no real plans for fast and rapid evacuation.

Q We are talking about something else. We are all not satisfied with the evacuation plan but I'm concerned with the statement you made in regards to the radiation in the area. Now, the information that I got, and I think that DER did an outstanding job once they got with NRC in the area. It's the only time I give NRC a compliment because I don't think they deserve it any other way. But I think that they did do the monitoring and the press kept us informed that way. Now,

didn't you receive the same news that I received?

A Yes. And we also received information that there was a separation of hydrogen and oxygen in that reactor and if they combined, there could have been a hydrogen-oxygen explosion; that that could have serious consequences. That would have meant that the core was way below cooling and could melt down.

Q I can't argue with that. There is no question on that.

A That was our main concern.

Q That's not what you said down there. You made the statement that outside you were concerned that they didn't tell the truth on that. They were not giving the right information.

A The general feeling we had at the time, shared, as I have discussed it with people, was that we could not be certain that we were getting the total information; that, in fact, we were not certain that the people involved had the total information as to some of the other problems that could arise.

Q Are you satisfied now that you think they did give you the right information or do you think they tried to cover it up?

A No. I think I'm reasonably satisfied now that the

information we got in the final analysis was fairly accurate.

Q Do you think the press did a lousy job reporting it?

A I think the press had the same problems we had. They had not been through this before. They covered it as fast as they could. They were not nuclear radiation experts. They did not know how to evaluate some of the numbers any more than the rest of us did. Given those circumstances, I think they had problems, as we all did, and I think they reported it to the best of their ability.

Q No further questions.

CHAIRMAN WRIGHT: Bob Hollis?

BY MR. HOLLIS:

Q Yes, sir. I'd like to as the Doctor one question concerning the plans the evacuate the patients and you mentioned the ambulances and whether or not we could bring the ambulances into the area. Was there ever any meetings or discussions between officials of the Hershey Medical Center and the Pennsylvania National Guard as to the feasibility and possibility of evacuation by helicopter?

A We raised that issue. When you ask, were there any discussions, I don't know if there is any policy for directing the National Guard. We were, of course, constantly

in touch with the Dauphin County units that were involved and the state units and they may or may not have been involved. I know we were told fairly early in the game that they probably could not evacuate by helicopter. I might add too, using the largest helicopters they have available, as we learned subsequent to this, if you have patients that are non-ambulatory with life support systems, you need a fair number of helicopters for this.

Q Right. But they also have the CH-47's, the Chnook helicopters, that can carry about 20 litter if you have the life support systems -- if you have that, we are reducing it due to the equipment. But they have 10 or 15 of those aircraft immediately available out at Indiantown Gap which is ten miles of Hershey. You do have a contract, if I might use that loose terminology, with the National Guard now for your evacuation of your neo-natal patients from outlying hospitals into Hershey and you have people who are trained with the equipment that would board the helicopters. That's why I can't understand why there was not in this case, when you already have an ongoing emergency evacuation plan with the Pennsylvania National Guard, a helicopter evacuation of patients maybe into your facility, why not that this plan was not placed into effect or the National Guard placed upon alert. I just don't

understand why.

A I honestly don't know but I do know that our emergency command unit, we never had any assurance that we would have that at our disposal. I should also point out that there are other member hospitals in the immediate area. That involved some 750 to 1,000 non-ambulatory patients. It would have been a big evacuation. All I can say is I don't know why not but we never had the assurance that those helicopters would be made available to us.

Q That's a point because the Adjutant General indicated that he had all these units on alert and they were available and why you would not have been possibly assured that, if required, you would have had so many aircraft that had the capability of handling so many patients, that's a question that we have to look at. That's why I asked it. Thank you.

CHAIRMAN WRIGHT: Representative Stuban?

BY REPRESENTATIVE STUBAN:

Q Doctor, one question I'd like to ask here. You said you had the -- Hershey Hospital had the contract to treat people that were affected by radiation?

A That's correct, from the Three Mile Island plant.

Q Right, from the Three Mile Island Plant. Is this a capability that every hospital has?

A In theory, yes. In other words, if someone is contaminated by radiation, it depends on how they have been contaminated. Often it's a question of washing them down, if it's an outside external contamination, and treating them for whatever they have taken internally and in theory, every hospital could have that capability. I can't speak for the Harrisburg Hospital but I would suspect that they would have, yes.

Q You say they could have but you are not sure that they do have?

A No, I'm not. What we have been doing in this period of time incidentally is to set up a whole stage and see in an area that was indoors to get people from the outdoors, assuming that perhaps there was a radiation environment and bringing in hoses and other ancillary equipment so that we could, in fact, wash off people; get rid of their clothes; start treating them, on a fairly rapid basis, if it came to that.

Q It most likely would require a special room or special procedures in the hospital to go about doing this without creating a problem through the hospital?

A That's right. This was going to be done, in fact, in our loading zone; brought right into the hospital itself

through the service door and on the loading floor be decontaminated so they wouldn't carry all that into the hospital. Then, we had the problem of change rooms, the usual problem of privacy and so on which we had roughly worked out. In case we had more than just two or three -- in other words, if we had 20 or 30 coming in, we needed some area like that.

Q Under your opinion then possibly hospitals within the area of the nuclear plants should have large areas to solve this problem if it does happen?

A Yes. Assuming they could use those areas for other things when they don't need it for that but they should be stocked for that. I think it would be useful, yes.

CHAIRMAN WRIGHT: Representative Klingaman?

BY REPRESENTATIVE KLINGAMAN:

Q Thank you, Mr. Chairman. Doctor, I'm just wondering. Do you have any idea what the average daily patient load is at the Hershey Medical Center?

A Yes. It's about 300. We have a bed capacity of 350. It's about 300 to 325. That's what you are asking?

Q I was just wondering because if we were to evacuate say a five or ten mile area, that's not the only hospital we would have to worry about.

A That's what I was alluding to before when I talked

about 750 to 1,000 non-ambulatory patients. That's correct.

Q So that planning for an orderly general evacuation, considering hospitals and nursing homes and whatever, is almost mind boggling, isn't it?

A This is --

Q It almost approaches the limits of impossibility.

A We decided during this time it would be extremely difficult to try to evacuate. You are quite right, nursing homes are something that weren't looked at very hard and would represent major problems as well.

Q Thank you, Doctor. Thank you, Mr. Chairman.

CHAIRMAN WRIGHT: We thank you, Doctor, for being with us. Your testimony is valuable and we thank you very much for being with us again.

DR. RAPP: Thank you for having me.

CHAIRMAN WRIGHT: You're next, Tom. Our next witness is Mr. Thomas Gerusky, Director of the Bureau of Radiation Protection, Department of Environmental Resources.

THOMAS M. GERUSKY, called as a witness, being duly sworn by Chairman Wright, testified as follows:

CHAIRMAN WRIGHT: Would you like to start off with a statement, Tom?

MR. GERUSKY: No, sir. You have five hours of my

statements earlier.

CHAIRMAN WRIGHT: No. Representative Reed?

BY REPRESENTATIVE REED:

Q Mr. Gerusky, I'm curious about your personal opinion concerning the degree to which you were cooperated with by the operators and the owners of Three Mile Island beginning March 28th and subsequently.

A I think the information we received from them over the open telephone line which we maintained throughout the incident was information that they believed to be correct. We did not delve into, for the first three days, delve into what was going on inside the reactor. We were concerned about what was off site. We were under the assumption that the Nuclear Regulatory Commission was taking care of the reactor hardware problems and our concern was off site exposures.

Q And your concern off site would, therefore, be, I assume, that dealing with public health based on the exposure that the public may have received from radiation?

A That's correct.

Q Did you have any other concerns; that is to say, DER, did they have any other concerns other than that question?

A Well, the potential --

Q What was the scope of your interests and your

activities?

A The potential for a significant release and subsequent need for evacuation was first in our minds all thr ugh the episode. As a matter of fact, early in the morning we made the assumption, based upon calculations at the plant, that doses across the river were ten R per hour or higher and requested Civil Defenr to stand by for an evacuation.

Q When was that?

A That was about 7:30, between 7:30 and eight o'clock in the morning on the 28th.

Q Ten rems?

A That's right. That was a calculated exposure based upon some pre-accident planning and the amount of radiation detected by the dome monitor in the reactor building and assuming a significant leak rate from the reactor building. That leak rate was not there. The reactor building was under slightly positive or normal pressure and, therefore, no leakage occurred from the containment building.

Q You say the ten rems per hour radiation exposure was a calculated exposure?

A That's right, based upon wind direction, wind speed and a calculated release rate from the reactor building, the containment building.

Q I'm curious, how did you get that calculated release rate?

A From the plant; from the health physicists at the plant who made the calculation after a general emergency was declared.

Q O.K. And the health physicists at the plant was making his calculations based on readings from on site --

A Readings at the dome monitor inside the reactor building. On site readings were not significant and, therefore, we didn't feel that there was -- we wanted it verified at that point that there was indeed radiation across the river because there was no radiation levels of any consequence on site outside the buildings.

Q Your calculated exposure of ten rems per hour at 7:30 p.m. on Wednesday, March 28th --

A AM.

Q AM?

A AM.

Q How long do you believe that that calculated exposure rate existed; for what period of time?

A Well, it didn't really exist. It would have existed if there had been significant leakage from the containment, from the containment building.

Q Speaking of off-site radiation monitory, did you receive any information from the owners of Three Mile Island relative to what radiation they may have detected in any of their 20 off-site thermoluscent dosimeters?

A Yes. After they had determined what those exposures were, we received the information.

Q And when did you receive that information?

A I don't recall. I think it was Friday, what their first readings were, on Friday.

Q And what were those readings; do you have recollection?

A No, but I have the data. The data is all contained in the population dose and health impace assessment done by NRC, EPA and HEW.

Q I'm familiar with that particular document. O.K. Thank you.

CHAIRMAN WRIGHT: Fred Taylor?

BY MR. TAYLOR:

Q Tom, you are getting to be too familiar a face. I have a question though. In Dr. MacLeod's testimony this morning, he said in the Department of Health, that they do not have a Division of Occupational Health; they don't have a Division of Radiological Health; that is lodged in the

Department of Environmental Resources. That's your department. For the benefit of the Committee, will you explain what the division of responsibilities are between your department, which is DER, and the Department of Health?

A Well, I'll try. I know what our responsibilities are. I'm not sure what the Department of Health's responsibilities are. We were a part of the Department of Health until the Department of Environmental Resources was created as were all other environmental health programs that were transferred to DER. So, in a normal -- well, prior to the creation of EPA and the concerns about environmental health on a long term basis, most of the environmental functions were in Health Departments throughout the country. Since that time, an awful lot of the environmental health functions have been transferred to Environmental Protection Agencies, including the federal government.

Q Is this throughout -- other states have done the same thing?

A Other states have done the same thing. Some states maintain half of the program in the Health Department, that concerned about x-ray protection which is part of our responsibility; and the environmental portion in the environmental department. When the decision was made to transfer us

and occupational health and the other programs to DER, the question came up of splitting the environmental portion of our program from the regulatory portion, the x-ray inspection portion. The decision was made by everybody, including the Health Department at the time, that it would be best to transfer the whole program because of the small staff and the variety of backgrounds and education needed rather than to have two separate agencies looking at the same problem and doing the same thing, worrying about public health hazards of radiation exposure which is what we do. I do not feel we have any problem. We haven't had problems with liaison with the Health Department in the past. We were part of the Health Department and we know many of the people who are there and we have had constant contact with them in the past. The problem was Dr. MacLeod was so new to the department, that he wasn't aware of what had happened in the past. When we came into this crisis situation, he didn't have time to catch up. So, we offered our help. We gave our help. We suggested that Dr. Wald come in to assist if he wanted someone personally at his side to advise him. Dr. Wald has been a member of our Advisory Committee and has been since its inception in 1966 and we place a lot of confidence in him.

Q As of right now, then the responsibility for the

protection of the citizens of the Commonwealth in regard to what could have happened at TMI or what did happen or the ongoing events is lodged with your department; is that right?

A Right. The law says that we are the agency responsible for protecting the public from radiation exposure.

Q Thank you , Mr. Chairman.

CHAIRMAN WRIGHT: Representative O'Brien?

BY REPRESENTATIVE O'BRIEN:

Q Tom, Harold Collins said that our state radiation emergency plan was not submitted to NRC for concurrence. Do you know why? Did they have a plan? You were supposed to have a plan.

A We didn't feel that there was a need to submit it to NRC. We felt we knew as much about emergency planning as they did and probably more.

Q Say that again, I didn't hear you.

A We felt we knew as much about emergency planning for radiation as the NRC staff that was involved in emergency planning did and our staff is comprised of certified health physicists. They don't have any on their staff. There was -- I called some of the states that -- prior to Three Mile Island, I called some of the states that had submitted their plans for approval and asked them why they did it and they

said it was political only and we didn't feel there was any reason for doing it for politics.

Q In other words, there was no rule governing, you had to submit the plan?

A No.

Q He also said that our state plan was not a very good plan. Do you --

A No. It's a very good plan. Our portion of the energency plan is a very good plan.

Q Your portion, but there are other portions in it that could be changed, in your opinion?

A Well, --

Q But the overall plan is not a bad plan?

A No. The overall plan is not a bad plan. It was a five-mile plan which is a problem when he calls and says evacuate out to ten miles.

Q No, no. Collins didn't impress me either. You heard my statement before about NRC official making the statement that there is a plan. What's the matter, Tom?

A I just couldn't hold it back, I'm sorry. I agree with you. I'm sorry.

Q O.K. That NRC has a plan and DER approved it, to clean up Three Mile Island but it would be politically unsound

to go in and do it now. My position in listening to the speech is that you can't put it under the rug. It's got to be cleaned up and there is a plan that will conform with regulations. What is your opinion? Do you think it should be done now or should we just sit back and wait and live with it for three to five years and wait until people are satisfied in order to eliminate it?

A I did not hear the speech by Dick Volmer, I guess.

Q Right.

A The problem at Three Mile Island is it's going to be there and it's going to cause people to be concerned until the reactor core has been removed and gotten out of there. There are problems right now of possible very high exposures to the people working there. There is a potential for a release of radioactive material from the environment at any time. It's very very small but there is a potential because there is a lot of radioactive or radioactivity in the plan and I would like to see that plant cleaned up as soon as possible. If there are no alternatives to the disposal of the liquid and the gas, the Krypton 85, if there are no alternatives that are viable to releasing it to the environment, it can be released to the environment within the technical specs of the utility which means that the exposures to the people off site

would be less than the normal exposures that are allowed on a routine operating power plant. If we have no alternative, I'd like to see that pursued and the plant cleaned up.

Q In other words, I guess you'd say while it's laying there, there is always an added danger. Better you clean it up and eliminate it gradually rather than wait the five years?

A There is water that is slowly leaking in the containment building. It's just a good idea to get in and get that thing cleaned up.

Q Once again, NRC is making a bad decision?

A I don't know what NRC is doing. I hadn't heard that before.

Q Is there any way that DER can look into this and find out what the plans are going to be and report back to the Committee?

A Yes. We have been asking Met Ed and NRC for their plans. We are concerned that they have looked only, for example, and done an environmental impact study on the Epicor system only and not on the releases also. We are concerned about the Krypton 85 release and we would like to see the alternatives to that explored and something done to clean up the reactor. It's possible that cryogenic installation will be the answer to all that and there won't have to be a release to the

environment. But let's get on with it. I'd like the thing cleaned up.

Q I'll try to get you a copy of that. In the meantime, I'd like you to find out for the Committee if there is a plan and why the delay.

A I haven't seen a plan. There is an engineering study that was performed by Bechtel Corporation which shows procedures that would be done to clean up the operation but that is not a plan.

Q He said they have a tank and everything there ready to proceed.

A They can start with the Epicor II system now and start cleaning up the water in the auxiliary building. The water in the auxiliary building has got to be cleaned up before they can start cleaning up the water in the containment building and they have just determined what the concentrations of isotopes in the containment building are.

CHAIRMAN WRIGHT: Representative Foster?

BY REPRESENTATIVE FOSTER:

Q Dr. Gerusky --

A Mister.

Q Excuse the promotion. My question dealt with levels of exposure in any given point on a perimeter. We would

perhaps hear readings of so many millirems. Would that measurement be both the intensity and the quantity of that radiation? In other words, is the term, let's say ten millirems or 50 millirems, is that a quantitative measurement?

A That is a total dose. It is not what was given out during the period of time. What was given out during the period of time was a dose rate, a millirem per hour, a MR per hour rate. I don't think there is any question that we were lacking in getting out as much information as we could. I think we were trying to get it to the Governor's office and collate the data and it kept changing from minute to minute during the first three days. And the information we kept getting from the plant and from the NRC was that the incident would be over within an hour and this is the last release and that didn't turn out to be that way.

Q I guess my analogy to it would be, for expample, that you were pumping water through a hose and it comes through at so many gallons per minute. The only way you can really know what quantity of water you would have, how many total gallons, would be how many minutes or hours are you going to pump. I guess that would be true with --

A That's right.

Q -- this type of exposure. So, you would really

need, I guess, two components in your measurement; the intensity --

A And the time.

Q And the time and we really only had the intensity in the initial reports, didn't we?

A No. We were giving out the doses to the press at the press conferences in MR per hour. It was reported in the press as millirem or MR and we were having a tough time -- I was having a tough time trying to compare it with something that they would understand so that the public would understand. We did a lousy job, prior to the accident, on educating the public on radiation terms and the press and so it was very difficult to explain what it meant and what the relative biological effect was from that kind of an exposure and I probably made the mistake of using the x-ray, the chest x-ray too quickly but I couldn't think of anything else, sitting up there or standing up there in front of the press.

Q Well, you can imagine the problems that I, as a layman, had trying to explain to constituents.

A We understood the problem and we were trying to figure out how to resolve it. I still don't know how to do that.

Q .M. Thank you.

CHAIRMAN WRIGHT: Representative Cowell?

BY REPRESENTATIVE COWELL:

Q I have two questions or a question in two areas. First, a question on the monitoring of radiation levels. We've had a few newspaper articles in the last couple of weeks that have indicated the state, I understand, has discontinued certain monitoring. Can you elaborate on that or explain in what areas we are no longer monitoring radiation levels?

A No, I can't. We have increased our environmental monitoring. Well, we have decreased the scope of the monitoring from the time of the accident to now but we haven't decreased anything in the last couple of months and we are, as a matter of fact, starting to increase with the availability of some additional instrumentation that we have.

Q And you're monitoring air and water?

A Air, water, milk, vegetation. The DER, in cooperation with the -- I can't remember the name of the organization in Philadelphia -- has just put out biological monitors in the river to determine what levels of radioactivity are accumulated in biological, through the biological mechanisms in the river. We have increased our monitoring. We have increased the number of thermoluminescent dosimeters that are around the plant. We have increased air sampling around

the plant. We haven't decreased anything as far as I know.

Q And you are not familiar with the newspaper article I'm speaking of?

A No.

Q I'll have to dig that out of the file. Perhaps we can share it with you later on. It may have been in error. It may have been referring to something else.

A The environmental monitoring problems change as time goes on because isotopes with short half lifes aren't there any more so you don't look for those. So, there are things that you do differently as time goes on.

Q O.K. The second issue deals with a question that as I again recall, it was raised during your last appearance before the Committee. Do I recall that there was a young man with you at that time?

A Yes.

Q O.K. And as I recall, during the conversation that a couple of us had with him during formal testimony, there was raised the issue of whether the Bureau had adequate staff to do not just Three Mile Island but several plants around the state. Has there been any action or, at least, more consideration given to the staffing question and some of the other issues that we discussed that day?

A Yes. As you are well aware, we did receive an additional $300,000 in the budget this year. We have proposed to increase the staff by six people. We still haven't received approval from the Budget Office to hire any individuals or to spend any of that money on the rebudget. The rebudget hasn't been approved yet for the department. In next year's budget we are proposing hiring additional staff and additional, purchasing additional equipment. What we are proposing is one nuclear engineer per site by next year.

Q By site --

A That was the discussion that was held previously with Mr. Dornsythe and that was that he would recommend one nuclear engineer per reactor site so that someone could keep up to date with what is going on in each plant and that is being done in our recommendation for the budget for next year.

Q That would be a resident engineer?

A No. That would be an engineer who would be located here in Harrisburg but his prime responsibility would be to investigate, to keep up to date on that operation.

Q Thank you.

CHAIRMAN WRIGHT: Bob Hollis?

BY MR. HOLLIS:

Q I'd just like to follow up on a point and that

was your response to Representative Cowell's question. Previously you indicated that you had spaces already authorized out in the Pittsburgh area that had not been filled for some reason or the other. You had a shortage in your staff in your Pittsburgh Office and, therefore, you were not -- if an accident happened at the facility out there, we might have had a problem. Of those spaces, have any of those been filled yet in Pittsburgh?

A No. We received no authorizations to fill any vacancies yet. That's included in the rebudget proposal.

Q There was a special $300,000 given to you, DER, and you indicate that you have not been given the authority to hire or to spend that money yet?

A That's right.

Q I don't believe that. What is going on with the administration? This was a special appropriate that was specifically for improvement in radiation monitoring and detection and they haven't authorized you to spend that money?

A They haven't authorized the department at all because the rebudget hasn't come back. We are just spending on the same rate we were spending prior to the budget being approved.

Q Well, I don't know where the priorities lie in the

administration with all of the publicity that is generated as a result of Three Mile Island and the special appropriation was made for additional money and you have not been given authority to spend it. Someone ought to be looking into the Budget Office or the Governor's Office or what this administration is doing when it comes to priorities.

A When we ask the question concerning the question when the rebudget is going to be approved, we are told tomorrow and it's been tomorrow and tomorrow and tomorrow. I don't know when it's going to be approved.

Q Mr. Chairman, I think somebody ought to take a real hard look because I think you were the prime sponsor of that additional appropriation to DER and they still don't have it.

CHAIRMAN WRIGHT: Thank you, Tom.

MR. GERUSKY: Thank you.

CHAIRMAN WRIGHT: Five minute break.

(The hearing recessed at 12:40 p.m. and reconvened at 12:45 p.m.)

CHAIRMAN WRIGHT: Our next witness is Mr. James Elder from Saxton, Pennsylvania.

JAMES ELDER, called as a witness, being duly sworn by Chairman Wright, testified as follows:

CHAIRMAN WRIGHT: Would you like to make a statement? You may proceed?

MR. ELDER: First of all, I'd like to make the statement that I don't claim to have any real expertise in radiation pertaining to sickness. I have done a considerable amount of work over the past two and a half years pertaining to the Saxton reactor that we had there. It was the fifth commercial reactor to be built in the United States. It was an experimental type. It was attached to a coal burning plant in Saxton. It ran from 1962 to 1972 and when the word first came out that we were going to have this reactor built, it was really good news for the area, we thought at that time. Now, some people had some doubts. The coal mines had been shut down. The railroads were scrapped. We had no employment. Unemployment was high. There was virtually no opposition to this reactor going in. Anything that the media happened to print about it, looking back over it now, looking back over the files of the various newspapers, it was strictly, in my opinion, public relations junk by GPU and the others involved in nuclear energy.

I have not been able to run down one article by the New Yrk Tmes but I have been told by a chemistry professor from up in New England that it did mention that Saxton was

chosen for the site because of the fact it was located remotely in the mountains and that the population was sparse in that area; that in the event there would be a nuclear accident, that damage would be minimized. In my opinion, the people of Saxton were guinea pigs to this and we were thought to be expendable by the power companies. To my knowledge, there was never a public meeting to let the public have their say before this reactor came in. Now, I wasn't living there at the time. I was in college in 1959 when the word came out. I think maybe there might have been a public meeting somewhere but if I remember correctly, it was in Pittsburgh or someplace very remote from Saxton. PR people had a lot of good news for us back then. It did bring scientists in from all over the world. It brought a lot of employment to the area temporarily. It was supposed to run for five years but it ran for ten years. I think the additional five years was when they began using plutonium for fuel. They got another five years out of it. Our reactor back there was the first commercial reactor in the world to use plutonium for fuel.

As far as the bad news from this goes, for our immediate family, it came to us in the Fall of 1974 when one of our children was diagnosed as having terminal leukemia in Children's Hospital in Pittsburgh. He died in 1976. Up to

this time and a year beyond this, I had felt that nuclear power was the way to go. It seemed, from everything we read, that it was the ultimate in generating electricity. Approximately a year after my son died, our pet dog had to be put to sleep because it had leukemia. About that same time, one of the former reactor workers who was a superintendent at the reactor, it was rumored that he had a rare type of leukemia. He had moved to New Jersey but the rumor still was there. Now, there is some doubt whether he had leukemia or not but it was the combination of these that got me to thinking and being aware of all of the cancer that we had in our area.

So, I began to list the victims and began to send out letters. My first letter was to the National Institute of Health in Bethesda, Maryland. At that time, I had 26 victims. One-third of these victims worked either for Penelec or for the SNEC, the Saxton Nuclear Experimental Corporation, which was attached to the Penelec plant. NRC, or rather the National Institute of Health did not answer my letter. They, in turn, forwarded it to the Nuclear Regulatory Commission. I got a letter from a Mr. Carl Abraham from the NRC and it more or less said maybe you ought to have some second thoughts about what you are doing because it appears that you are invading these people's privacy because I had the names of the victims

in the letter. He in turn forwarded it to the Pennsylvania Department of Health. I was visited shortly after that by two doctors in 1977, Dr. Geiger (phonetic), who is a dentist, and Dr. David Skooly (phonetic), who is a medical doctor. Now, when they visited me, I was shocked at the approach that they made. Dr. Geiger said why are you doing this? What's in this for you and it set me back. I had no idea what he was driving at and I still don't know to this day. He couldn't understand all the work I was putting in it if there wasn't something in it for me. I said I have two goals in what I am doing. One is to get a professional study made in the area to either prove me right or wrong; hopefully, it will prove me wrong. And the other is to get cancer made a reportable disease so we can get a better handle on where the hot spots are and what is causing some of this cancer.

Shortly after I was visited by the two doctors from the Department of Health, I read in the paper about Dr. Glen Caldwell who was doing a study on Operation Smokey out in the State of Nevada in 1957. It was a military operation. He was studying GI's who were exposed to radiation. He was able to track down 750 of the 2200 GI's that were involved. Out of that 750, he had pinned down six leukemia cases out of the GI's. That was approximately one-quarter of the men there but because

of shoddy record keeping by the Arm, he was unable to track down the others. If he would have been able to diagnose or document one more case of leukemia in the last three-quarters, he would have had a direct statistical link between low level radiation and leukemia. When I wrote to Dr. Caldwell, I had 35 cases of cancer, including six leukemia's. The answer I got from him was that my cases were conservation; that we should have more than that. Leukemia was a little bit high but not significantly high. I don't feel that I got a fair shake from the Center of Disease Control in Atlanta because they were taking my statistics as if I were a professional researcher instead of a lay person who worked on it in my spare time. There were three people that they would not count in my statistics. One was the superintendent who I have already talked about because he moved to New Jersey. So, I would have to include all of New Jersey if I included him. They would not take into account the fact that he worked at the reactor.

Another boy who worked at the reactor had moved to Blairsville. When the reactor closed down and the coal fire plant, shortly after the reactor closed down, the workers moved away. It didn't seem to matter, the fact that they had worked there. It was where they had died or where they had contacted the leukemia. He would not count those. Maybe I

shouldn't but I still count them in my statistics. I think anybody that has an open mind on it, they are going to have to track down some of the people who did work there.

Another problem that I have in trying to make my statistic significant is the fact that the reactor lies just about a stone's throw from the county line. Now, when Dr. Geiger checked the statistics for Bedford County, he didn't take into consideration that the reactor lies right on the county line practically. The wind and the water -- water flows down river into Huntington County and the wind goes primary down to Huntington County. So, nothing was ever studied to my knowledge about Huntington County.

On April 28th there was a television show, ABC's 20-20, which showed Vivian Waterman and a Dr. Carl Johnson, University of Colorado Medical Center. Vivian had contacted cancer. She began doing the exact same thing I was doing. She had almost the same number of names when she sent them into the Department of Health at Colorado. I suppose it was the Colorado Department of Health. I'm not sure about that. But she got almost the exact same answer that I got from the Center for Disease Control. It looked like it came out of the same can. That her statistics were conservative; she had nothing to worry about. Dr. Johnson then got in the act and

he did his own study. This was in reference to the Rocky Flats Atomic Weapons Plant and he came out with a significant difference in the triangle down wind from the reactor; that there was a significant increase in the amount of cancer within that triangle lying down wind. Of course, the pro nuclear people came out and said that Dr. Johnson's study was non-scientific and they discounted it.

Some of the other places I tried to get interested was the Penn State Medical School at Hershey; 60 Minutes, nobody was interested. I wrote to the University of Pittsburgh, to Dr. Tom Mancuso, and he encouraged me and said no matter what anybody has told me at this point, he felt that the evidence presented to him was significant and that it should be investigated; but there were no funds available and he could not help.

At this point, I was beginning to feel a little bit like Thomas Edison when he was trying to invent the light bulb. Somebody asked him how he was doing and he said he was making progress. He knows 400 things that don't work and at this point, I knew at least several dozen places that weren't interested in coming in and doing a study in Saxton.

Now, in 1978 our local weekly newspaper editor wrote to the NRC. He got a letter back from Carl Abraham who said yes, there were releases at Saxton but they were relatively

minor. And that he said there were no releases that would affect the health. Then he clarified himself, with one relatively minor exception. He said it was on May 14th, 1968. About a year later, we found out that that was an error. It was May 14th, 1970. Approximately 19 curies of radiation were released. However, they can't really tell how much was released because the monitoring systems they had at that time were only capable of monitoring so much radiation and during all of the releases which I will talk about, the radiation monitors were pegged full scale which means they knew at least that much was coming out but they had no idea how much more than that was coming out. The May 14 release lasted 14 hours -- not 14 hours, four hours, I'm sorry. What to me is upsetting about this is the fact that Tessie (phonetic) Mountain High School lies only about a quarter of a mile from the reactor and many times down wind. I have no idea of knowing which way the wind was blowing that day but I have been out there at times when the wind was blowing directly from the reactor.

August 26th of the same year they had another release that lasted five minutes. Now, they talk about their backups and that things can't go wrong because of the backups. Well, we know that they can go wrong. I don't know if there is anybody here that knows anything about plumbing or not but

six check valves failed in that five minute release on August 26th. A check valve is a valve which allows the reactors or fluids to flow in only one direction. Six of them in a series; one, two, three, four, five six, failed. Now, you would think that six would be enough for proper backup but it wasn't in that case. Fortunately, the release only lasted for five minutes.

I wrote to them and got that report, got an inspection report that told me of these releases. And each time they talk like this was it, you know; there was nothing other than this. Well, after I got the report, later on in July of this year, another reporter, Ron Morgan for the Daily News, the Huntington Daily News, wrote and he found that there were two releases in 1971, one on November 29th which released 80 curies of radiation, including radioactive iodine. The kind of unique thing about this release right here is that it happened at a time, if anybody is familiar with that particular part of the state; on the first day of deer season, you will know that there are more people in that particular area on that day probably than any day in the year. That's the day it was. That will be a very difficult one for anybody to study, if they ever try to study that release. It was, according to WTAE TV who did a story on my project, the worse release of any of them.

Before that, I was told that the May 14 '70 release was the worse. This release 80 curies of radiation and included radioactive iodine. I happen to remember that day. Now, scientists would say my way of telling what the weather was like that day was not scientific but I killed a buck that day. And when I found out, looking back over the calendar that it was the first day of deer season, I went down and checked my antlers to see if I killed a buck that day and sure enough, I did. I remember shooting that deer because the weather was so bad that I had to take the scope off my rifle and I shot it with an open sight and I remember that. So, it was bad weather that day and probably contributed to the problems of the release, I would think.

There was also a release on December 15th which was a school day. During any of these releases was anybody ever informed of any possible danger. I feel that the SNEC people did not have the right to take this into their own hands and decide whether or not there was danger to our children sitting in the school there. I think the school officials should have been able to make that decision. There are approximately 900 students and staff at the high school.

During my two and a half years of looking into SNEC, and once again I make no claims at being a professional.

I'm just telling you some of the things I happened to find out that I feel are accurate to the best of my knowledge. I believe SNEC was rnn pretty shoddily. I have a letter in my attache case to R. C. Carlton from R. L. Spencer. They are reactor inspectors. It's dated October 5th, 1970. The letter indicates that Mr. Clay Montgomery who was President of SNEC at the time had vehement feelings toward AEC compliance. I take that to mean that he wasn't very hap / about complying with Atomic Energy regulations. When I started to get a little publicity on this, Penelec made a statement that nothing was every covered up up there; that their records were always open to the public in the NRC Public Document Room in Washington, D.C. I don't know how the people of Saxton were supposed to know about these when it was a three hour drive to Washington, D.C. I questioned not only their accidental releases but what they were allowed to release and if my figures are correct, and I don't claim to be a sharp mathematician, they were allowed to release about 4,000 curies a year and I suppose this was zenion (phonetic), which many people say is harmless but if this comes back down which, with bad weather, I believe, like on the worse release there was, it can be changed to barium CCM and cerium which can be very dangerous to the human body. Now, they say 80 curies was nothing because

they released 13 million curies at Three Mile Island. Maybe so but I don't think anybody knows for sure. I think that's why this hearing is here today, they don't know.

Up until recently, we thought all of the waste was taken to Kentucky and buried. We found out that all the spent fuel is buried right at the site of the reactor when they decommissioned it. I have a letter here from the NRC that they admit now that our cancer rate is approximately 25 percent higher than the norm in our area. They admit to the leukemia being twice the norm. However, my statistics taken from Harrison's Textbook of Medicine in 1974 indicate that our leukemia is six times higher than the national norm. Of these cases, I know of two that are of the acute leukemia type which is the kind that showed up primarily after Nagasaki and Hiroshima. Your more common type of leukemia which we hear about today, the one that can be cured, supposedly was not the primary leukemia after those blasts. I also have a case of a Penelec worker with bone marrow cancer with multiple myeloma which is very significant. I found these things out, as far as the statistics, through a Dr. Shively from the Broad Top Area Medical Center who is now working with me on the program.

I have a letter here that says that the NRC may possibly do a study in the Saxton area and to quote from the

letter, referring to our high cancer leukemia rate, it says, "The possibility that ionizing radiation could be the cause cannot be totally dismissed." They are about to do a study, feasibility study, to find out whether or not they need to do a study. That sounds like so much gobbledygook (sic) to me -- studies to find out if they need to do a study. I could save them a lot of money, I think, by sending them the information I have back there in my attache case and know they need to do a study in our area.

I already talked about my goals. Once again, I make no claim to being a scientist. I'm just a lay person but if we can't get a professional staff in to do the study, I have volunteers that say damnit, if they won't do it, we'll do it ourselves. We plan to get people in the various boroughs and townships to collect all of the cancer data we can, run it through statistics and find out what happens.

My other goal is, and you people can help me with this. If you can introduce legislation to make cancer a reportable disease, I think that would be one of the biggest things in cancer research that we could have.

Now, I can't say that the SNEC reactor was the cause of our high cancer-leukemia rate in our area but if anybody would investigate, they would find out that there is no

industry there to pollute the air. There is nothing there but farms and forest and it might not be the cause of it but I think in probability, it's way ahead of whatever is in second place. Thank you.

CHAIRMAN WRIGHT: Representative Reed?

BY REPRESENTATIVE REED:

Q I'm the one that you sent the letter to. The Chairman of this Committee asked me to invite you to be here.

A Thank you.

Q And that was followed up by a letter from Representative O'Brien also requesting the same and we appreciate the Chairman asking you to come here. It's unfortunate that Mr. Gerusky, the head of the DER Radiological Health Bureau, is not remaining in the room. The legislation to require cancer to be a reportable disease in Pennsylvania has already been introduced by myself and others and was done so prior to the summer recess of the Pennsylvania House of Representatives on July 11th of this year. The experience that you have had with the NRC, have you been in touch with the Department of Environmental Resources at all?

A No, sir.

Q Have you ever been contacted by either the State Department of Health since your initial meeting between the

dentist and the physician that came to visit you in 1977? Have you heard from them or from DER?

A Dr. Skooly paid me a visit in June of 1978 and he told me -- I laid everything out t him that I had at that time which was not nearly as much as I have now -- and he said hey, you have convinced me but he said we don't have the funds or the personnel to do it. And then he's the one who put me on to put cancer a reportable disease. He said that's about the only thing they can do because he said he thought what I had would make a good study. He was quoted in the Johnstown Tribune Democrat just a couple of weeks ago with pretty much that same statement.

Q How do you know that nuclear wastes from the Saxton experimental plant are buried at the plant?

A According to a news article just about two weeks ago, this Clay Montgomery who was the former President of SNEC -- maybe he's still President of it -- I guess the corporation still exists. He addressed the Environmental Advisory Council or something of that nature of Huntington County at a breakfast meeting or luncheon meeting and there was a rather lengthy article in the news and he made the statement in there that it was buried in concrete and it's environmentally safe.

Q How far from the Saxton plant is your home located?

A Approximately one mile to a mile and a quarter.

Q How many people live within a five mile radius of the Saxton plant?

A I'm guessing. These aren't very accurate. That's one thing the doctor and I plan to find out a little more specifically. The area that I'm studying is not a complete circle. It's approximately a five mile radius elongated to about nine to ten miles down wind and down river from the plant; not only because I feel that that is where it's most likely to crop up but just because I happen to know the people better in that area.

CHAIRMAN WRIGHT: How many people is that?

MR. ELDER: Approximately 2500. And that's where I get my statistics. From Harrison's Textbook of Medicine, you would have six cases of leukemia per 100,000 per year and that boils down to two in this particular area that I am looking at in 14 years. So, in 14 years, I have 13, six times the rate.

BY REPRESENTATIVE REED:

Q You are saying that of the approximate 2500 people

within a five mile radius, to some extent an elongated portion of that making it nine to ten miles down wind which, I gather, is --

A It's situated between the mountains and practically everything falls within that.

Q Out of those 2500 people, the incidence of leukemia is approximately six times the national norm?

A Yes, sir.

Q For the 14 --

A That I know of. I might add, being a non-professional researcher, I don't know all of them. As a matter of fact, one Sunday afternoon I called a woman to check on her husband's death. In checking with her, I found two other ones that quick and they all live on the same street corner.

Q These 13 leukemia patients are all confirmed leukemia patients?

A Yes, sir.

Q In fact, you do know that th se cases, at least those cases, exist?

A Yes.

Q I see. Was there an evacuation plan that you knew of in existence for, let's say, a five mile radius of

that Sacton plant?

A If there was, it was kept a well guarded secret. I'm a life member of the fire company and you'd think that we would have known about it had there been one.

Q Where is your fire company at?

A Borough of Saxton.

Q And the Borough of Saxton is how far away from the plant itself?

A Approximately a mile. Well, parts of it would be approximately a half mile.

Q So, your fire department would be the primary emergency response group in the event of an accident?

A Yes, sir.

Q Was there ever any explanation from the company that you received with regard to the four different uncontrolled releases of radiation, any explanation?

A The only thing I ever got was from the NRC in the form of inspection reports. I asked them other poignant questions but never got any answers other than what I could dig up from the inspection reports for myself.

Q And do you know for a fact that the four reports on uncontrolled releases of radiation in 1970 and '71 are, in fact, the only incidents of uncontrolled radiation releases?

A No, sir; I don't know that.

Q In fact, there could be more?

A There could be. As a matter of fact, they do not have the records beyond 1965 for the plant. So, who knows what might have happened before 1965?

Q How would you characterize NRC's willingness to share information on this matter?

A Very limited, sir.

Q And who did you deal with at NRC?

A Dr. Carl Abraham and Deny Snyder. This letter right here, it actually came to us through Congressman Shuster. It has somebody else signature on it which I cannot read but the name under the signature is Lee V. Gosick, Executive Director for Operations and that came from Washington, not King of Prussia.

Q Are you aware of any monitoring for radiation releases that is ongoing at the decommissioned Saxton power plant?

A No, sir.

Q Where wastes are allegedly buried?

A Other than the fact that GPU supposedly comes around and checks it quarterly. Then, the NRC comes around every two years.

Q And I assume that they just make an on-site

inspection for that particular moment that they are there?

A I could not answer that. I don't know.

Q Has there ever been any public disclosure of what GPU and/or NRC has made at the decommissioned plant?

A No, sir. There has never been anything released by them publicly about the plant except PR materials prior to its opening and during its operation.

Q Well, Mr. Elder, I'm sure you are impressed with the federal and state government, that they have protected your interest in Saxton. I say that facetiously. Thank you for coming.

CHAIRMAN WRIGHT: Any other Committee members? Representative O'Brien?

BY REPRESENTATIVE O'BRIEN:

Q My understanding is that NRC is inspecting the site now. Do you know this?

A When you say now, what do you mean by now?

Q Right now.

A Today?

Q Well, yesterday.

A Well, if they are, they didn't let anybody know. As a matter of fact, two reporters went down and asked if they could go through on the inspection tour at that time and they

said no, they would have to get clearance through GPU for that and they have not had it.

Q Two people from DER. Would you get the information and see what they can find out about it. O.K.

ACTING CHAIRMAN REED: No one else for any questions?

(No response.)

ACTING CHAIRMAN REED: Mr. Elder, thank you very much and I would request, on behalf of the Committee, that what documents you already have in your possession, including the NRC inspection reports which contain some reference numbers that will be helpful to us, if you would turn one copy of those into us, we'd like to pursue and I would like to pursue a number of the issues that you have raised; in fact, all of it.

MR. ELDER: Is there a way I could have that done before I leave Harrisburg today? It's hard for me to get copies made?

ACTING CHAIRMAN REED: Yes. See Mr. Marshall Rock who is sitting on my right and to your left.

MR. ELDER: Thank you for listening to me.

ACTING CHAIRMAN REED: Thank you for coming.

We have Dr. Kepford and Dr. Johnsrud.

DRS. JUDITH JOHNSRUD and CHAUNCEY KEPFORD, called as witnesses, being duly sworn by Acting Chairman Reed, testified as follows:

ACTING CHAIRMAN REED: The Committee staff or the Committee has been given basically five charges to investigate relative to the TMI accident. Today we are considering one of these charges which is the issue of health and radiation and I assume that either or both of you have a statement with regard to that.

DR. JOHNSRUD: Yes, I do, Mr. Chairman or Temporary Chairman. I will proceed, if I may. My name is Judith Johnsrud. I hold a doctorate in the field of geography, having written a dissertation on the topic of the political geography of nuclear power controversy here in Pennsylvania.

I am Co-Director of the Environmental Coalition which is a public interest organization that has been in existence in our state since 1970. It has been involved in many, almost all, of the reactor licensing proceedings before the Nuclear Regulatory Commission and its predecessor, the AEC, over that time period.

I would like to submit a biographical sketch later. We were notified by Mr. Rock only in the last couple of days of our appearance and we will have to speak extemporaneously for

you. I realize the hour is very late. However, I hope that members of this Committee will have the patience to hear us out since Dr. Kepford and I acted as the legal representatives, Dr. Kepford being so designated in the licensing proceedings before the NRC for Three Mile Island Unit 2.

Among the numerous contentions that we addressed in those proceedings were particularly the issues of evacuation plans, emergency response and monitoring as well as the issue concerning an ongoing hazard at that site, namely the still unresolved matter of the probability and consequences of the crash of an aircraft heavier than the plant was designed to withstand into the reactor. We do want, therefore, in particular, to address some matters that have come out of Dr. Kepford's assessments at the time and subsequent to that time with respect to TMI-2 and the health and safety.

As a bit of background for my position, my competence to speak to you, I would say that in addition to serving as Director of the public interest group, the Environmental Coalition, I was appointed to the Governor's Advisory Committee in 1975 and have served since then. I have served also on the Governor's Task Force on Energy Facility Siting here in Pennsylvania and on the development of a state comprehensive energy policy. And to give an indication that we

have a positive view towards energy, I am at present the Chair Person of the National Solar Lobby which is a follow-through from the Sunday Celebrations, those activists involved with developing conservation and solar alternatives to nuclear energy.

Dr. Kepford is the legally, is the designated legal representative of the Environmental Coalition at this time. He is a radiation chemist by training and has served as our representative in not only the Three Mile Island proceedings but a number of other reactor licensing proceedings. I would like to submit his qualifications for your records and with them, a summary of the involvement of our organization, going back to the early 1970's, in the licensing proceedings for both TMI-1 and 2. And we will be discussing some matters that relate to our findings, the shortcomings that perhaps have not come to your attention.

When I spoke with Mr. Rock concerning our appearance here, I asked if the evidentiary records of the NRC had been made available to this Committee or had been studied by the staff and he indicated that that record has not been part of your deliberations thus far. We believe that it might be highly beneficial for members of this Committee to have a guided tour through some of the statements that were very

positively made by representatives of the state, the utility and the NRC with respect to their capability to respond to the accident, statements which I think you will find, as we have found, are rather in direct contradiction to the after-the-fact testimonies of some of these persons. Dr. Kepford will address these matters somewhat more specifically.

We are somewhat troubled that it has been six months since the accident and the information that we think might have helped you, particularly in the questioning of some other witnesses and mostly, in particular, with respect to Dr. Kepford's subsequent dose analysis concerning the accident, have not been brought to your attention and for our having failed to do so, we certainly apologize and we hope at this late date you will find this information of particular significance to you.

I would like to, very briefly, summarize a set of about a dozen regulations, legislative recommendations, that we think might be of significance relative to your charges, if I may be permitted to do so. These are in a very generalized form and not in any sequential order. I would probably wish to supplement them for your record on some further reflection, if I may do so.

First, we would strongly recommend that this Committee

in turn recommend that the TMI-2 transcript be turned over to the State Justice Department for perjury investigations and for possible criminal prosecution of some persons who had testified in that proceeding.

Secondly, we would urge the recommendation of legislation, a resolution perhaps within one year's time, to require the Department of Environmental Resources to set radiation standards more restrictive than the Nuclear Regulatory Commission and EPA regulations. We would recommend a restrictive factor of ten to fifty, greater than the NRC-EPA regulations. There is in existence authority for the states to do so which was given by the Clean Air Act Amendment of 1977. I would point out that prior to a Minnesota case back in 1970 decided by the Supreme Court which gave the federal pre-emption to the federal government, Pennsylvania had standards which, as I recall, were ten fold more restrictive than the federal ones. We believe it's time for us to return to at least where we were.

We would recommend that Pennsylvania allow no additional nuclear power plants to operate in this state beyond those that are in operation today for many reasons which have been pointed out, I'm sure, to this Committee by those affected by TMI and most particularly, as I will mention

again later, in consequence with the fact that the Nuclear Regulatory Commission staff, within the past month, has declared the accident at Three Mile Accident to be in the category of a Class Nine accident. Now, TMI and no other reactor, commercial reactor in the country, has ever been licensed with due consideration of a Class Nine accident. Always, under the regs of the NRC, such consideration has been excluded. Parenthetically I would add, in the Three Mile Island proceedings, we were prohibited by the Board from even asking questions about emergency preparedness beyond a 4.8 mile radius of the plant. Under those regulations, it was said that a more serious accident need not be considered.

Fourth, we would recommend legislation to speed implementive legislation for mandated conservation in ensuing applications in order to phase out the existing nuclear reactors in Pennsylvania in the near future. I think it becomes more and more important and apparent to all sectors of our society that a dependence on nuclear energy is involving us more and more deeply in a series of accidental releases, accidents, within the full cycle at a time when, in addition, we have not resolved radioactive waste disposal sufficiently.

Fifth, we recommend legislation to require DER and the Justice Department hereafter to take an active role on

behalf of the public health and safety in all NRC proceedings by opposing the applications, licensees and the NRC; in particular, their upcoming proceedings involving both Three Mile Island Unit 1 and 2, Susquehanna 1 and 2, in which Dr. Kepford and I are also intervenors in the public interest. By the way, the Commonwealth did not even have an attorney present at the prehearing conference for the Susquehanna reactors although Mr. Dorsythe from the Bureau of Radiological Protection was there. Limerick, Units 1 and 2 will be coming up for an operating license within the next few years. Fulton 1 and 2 in southern Lancaster County are up for early site review and approval which we believe would bypass the intent of the Act; and Beaver Valley 2, one of these days, will be ready for an operating license proceeding and the Peach Bottom reactors, 2 and 3, will be considered along with TMI, in which proceedings Dr. Kepford is involved, concerning the inadequacy of the NRC's treatment of the largest single source of radioactivity in the fuel cycle, namely Radon 222, about which he will speak more later.

Six, we would recommend that the state Legislature provide DER with even more funding to hire staff and consultants who are independent of prior commitments in favor of the expansion of nuclear energy to provide a critical balance in the

staff of the Bureau of Radiological Protection which, very frankly, we have felt was sorely lacking.

Seventh, we would ask that the Legislature provide adequate funding for an extremely expanded DER monitoring capabilities in the vicinity of all licensed nuclear facilities. I think we are all most keenly aware of the fact that not only has it been inadequate but that the monies appropriated have not been released and utilized.

Eighth, we would recommend the separation of all functions of the Office of Consumer Advocate from the Justice Department so that there will be a pure independence in proceedings by that office and that that can be pursued. And we would ask also that the consumer advocate be directed and adequately funded to conduct a full and confidential analysis of the costs of the entire nuclear fuel cycle including all of those costs which are presently excluded from the need for required cost benefit analysis. For example, one finds that such costs include the subsidy represented by the Price-Anderson Act, a matter which was testified to by the Pennsylvania State Insurance Commission in the licensing proceedings way back in 1973 for the Three Mile Island Unit 1. It is a subsidy that was then estimated to be greater annually in terms of the cost of premiums than the operating costs for

the reactor for an entire year. Among the other areas that we feel need to be included in such an analysis are enrichment costs, subsidies involved there; the lack of appropriate treatment of uranium mill tailings and open pit mines which are sources of the radon gas that Dr. Kepford will discuss; the cost of research and development that have been picked up over the years, the decades, by the federal government; decommission costs; spent fuel storage; radioactive waste disposal in both research and development and also long term costs of implementation; and the costs that can be estimated now on the basis of our experience here in Central Pennsylvania of emergency recovery which would follow the occurrence of a Class Nine accident with significant off-site releases.

Ten, and I'm almost through with these, we would urge a recommendation directing all agencies of state government to withdraw or suspend the existing permits to operate reactors in Pennsylvania pending full review by the NRC in full adjudicative proceedings of the range of events and consequences of those events to the public that would occur should a Class Nine accident with a breach of containment take place at a reactor. We are, as Mr. Gerusky has pointed out, down to that last line of defense at TMI. A breach of that containment would, even at this late date, be a most serious event in

Central Pennsylvania.

The aircraft issue that Dr. Kepford raised in 1974 with respect to TMI-2 has not received or has not yet been resolved and has, in fact, received an order from the NRC Licensing Board in the last few days concerning the possibility that they not go back to hearings on that issue for TMI-2. We believe that is a matter that certainly needs to be resolved.

Eleventh, require the expansion of the planned DER long term follow-up study of the TMI-2 accident in order to enc mpass, at the very minimum, the special distribution of possible doses in the 50-mile radius of the plant. There is, in fact, so much unknown about the full magnitude of those doses, the lack of measurement at ground level beyond the 13.8 miles in the early days of the accident, and the general applicability of meteorological information for that entire radius where people may have been exposed to much higher levels than our estimates from the NRC and the utility would indicate.

Finally, with respect to evacuation plans, we have very bluntly come to the conclusion that it's impossible for and evacuation of the area that would indeed be deeply affected by a Class Nine accident with a breach of containment; so

impossible that it would be a futile exercise in, I have to say, misleading the people of Pennsylvania at this point for us even to attempt regulatory enactments on evacuation plans. It would sanction the impossible, I think, is the way to put it. And with this regard, I want to point out in particular one of the documents we wish to submit to you today, namely a study that has been long ignored, done by the AEC back in the mid 1960's as an update of their famous Brookhaven Report on the possible consequences of an accident. And in that document, the 1964 and '65 update which we are submitting for your records, we found, during the accident, the NRC's own statement that -- or the AEC's own statement that the area in which deaths would occur would extend 150 kilometers, approximately 19 miles, from the reactor. This is, therefore, a zone far greater than, I think, any of us have been led to believe would be affected with short term deaths as well as the long term health effects.

Now, I would like to say much more. Perhaps I could supplement Dr. Kepford's comments and I would appreciate your careful attention to what he has to say. Thank you.

DR. KEPFORD: Thank you. I'd like to start off by -- well, first off, this stack of materials here, the vast majority of it, we are submitting to you for your considera-

tion. I'm sure most of the materials here, the vast majority of other people who have testified before you, would not want you to see, including this 1964-1965 update to the famous or infamous, depending on how you want to look at it, Wash 740 or Brookhaven Report. The Wash 740 Report was commissioned by the Atomic Energy Commission to discuss what would be the consequences of an accident, serious accident, at what was then considered to be a large nuclear power plant. That nuclear power power plant is about a quarter of the size of Three Mile Island, Unit 1, Unit 2. In that report, the Atomic Energy Commission found that the property damage in 1957 dollars could amount to $7 billion; deaths could be up to 3,400 and 43,000 people injured. These deaths now are primarily deaths due to acute radiation sickness.

In the 1964-1965 update, one of the major findings was that the design of nuclear power plants had simply made the plants larger on the basis of virtually no operating experience, four to five times larger. So, the original study team was reconvened to study this problem. And I'd like to read you a few isolated sentences from this. I'll identify what I'm reading from and you have a copy of it there. From page 84-5, it's document 84, and most of these -- this report was never finalized. Most of the documents I'm going to read

from are minutes to meetings which were held. There are a couple of sentences here from Document 84, page 5. This is, "In the event of a core meltdown and subsequent breach of containment." They found that 100 kilometers the levels were still 100 times the protective action guies. That is, the radioactive levels of cesium, strontium and so on. The result to the city involved would be catastrophic and there would be deaths out to 150 kilometers; again, acute radiation injury deaths. Cancer, thyroid abnormalities would take place over much much greater distances.

Most of the damage -- this is Document 92, page 7 -- most of the damage is done by that activity released in the first two hours. As a result, if there were only two or three hours available for evasive purposes (sic). Miss Court noted that at close in, there was very little that could be done since doses were higher and received sooner. Mr. Smith added that the population involved was large and would make evasive measures difficult. A point I'd like to add here is since this report was written and this particular document was written in January '65, I thik -- no, December 16, 1974 -- reactors have become larger yet and much closer to cities than was envisioned in 1964 and 1965.

And from the same document, 92, page 4, for a big

accident concerning contamination -- for a big accident, the area would be the size of the State of Pennsylvania. Now, for those of you who saw the China Syndrome, the occurrence in that movie that the affected area could be the size of Pennsylvania was not the figment of the imagination of the author. It came directly from 1965-1964 Atomic Energy Commission documents which, for its mere existence, the Atomic Energy Commission denied its existence for eight years until under the threat of a Freedom of Information suit in 1973, I believe, documents suddenly disappeared, a couple thousand pages, of which we are giving you on the order of 50 or 100 pages. It makes very very interesting reading, especially in the light of the Three Mile Island accident.

I'd now like to turn to the initial decision of the Licensing Board, which you have, and call your attention to, in particular, intervenor's contention two, five, six and eight in our intervention petition which began on page six, 21, 28 and 33 of this initial decision; and also the discussion of health from uranium fuel cycle which begins on page 69. Aircraft crash is discussed on page 21, and this is a very sore subject for the Licensing Board to discuss because moments into that discussion, one of the Board members of the Licensing Board stopped the proceedings and said aren't what we are

talking about here a Class Nine accident and all of the parties had to agree; the staff, the applicant and all had to agree that in the event of the crash of a larger than designed based aircraft and a larger than designed based aircraft, in this case, was an aircraft weighing more than 200,000 pounds flying at 200 knots or more. And everybody agreed that in the event of one of those crashes, what we would be faced with at Three Mile Island would be in effect an uncontained and uncontainable core meltdown for which there would be no engineering safeguards which would work period. This is due to the proximity of Three Mile Island to the runways at Harrisburg International Airport.

That issue was resolved by the Licensing Board by accepting virtually without question everything the witnesses for the staff and applicant said and inspite of the fact that we had cast, in our opinion certainly, quite a bit of doubt on their methodology and results.

The Appeal Board of the Nuclear Regulatory Commission ultimately agreed with us and in August of 1978 issued a lengthy opinion in which they required the staff and applicant to go back and do a much much better job at the probability analysis to analyze much much more data with subsequent hearings to be held in December of 1978. Those

hearings were held -- oh, in September of 1978, the commissioners of the NRC reviewing that Appeal Board decision, suggested further avenues for the staff and applicant to look into. We were very shocked when the hearings came about on December 11th and 12th of 1978 that the staff and applicant had not only done a very poor job of addressing the concerns of the Appeal Board and the commissioners of the NRC, they had, in fact, gone out of their way to, in my opinion, conceal information which would have thrown their computational methods out of the window entirely. And when this subject was mentioned, the members of the Appeal Board responded not by questioning the staff and applicant. They responded by getting mad at me for having suggested that perhaps somebody might have committed perjury and the matter there stands today. In my opinion, they did commit perjury. Subsequent hearings were scheduled for April 4th, the third round on aircraft crash; April 4th, 1979. Mercifully, they were cancelled on April 2nd by notice from the Appeal Board but we got a notice in the mail about a week or so ago from the NRC wondering whether or not, from the Appeal Board, whether or not -- and asking for a memorandum on the subject -- whether or not it was appropriate at this time to bring that issue back to the forefront. We haven't responded yet and I'm not sure how we'll respond.

But, of course, needless to say, the plant was licensed anyway, even with this unresolved and possibly unresolvable very serious safety issue.

Concerning off-site monitory, it's discussed beginning on page 28 of the initial decision. I'd like to read you a paragraph from page 30 of that initial decision. It's very interesting in light of subsequent events. "Instrumentation used to determine the severity of an accident and the need for any off-site emergency action is located off site and is monitored in the control room. This instrumentation monitors area conditions and process variables such as reactor coolants, temperature and pressure and any abnormal release of radioactivity. In the event that accident conditions arose for which evacuation would be an effective safety measure, necessary corrective actions to mitigate the consequences including notification of off-site emergency personnel would be performed quickly, within ten or fifteen minutes of the incident." This is the kind of basis and trash testimony, if I can be so bold, on which nuclear power plants are licensed. It wasn't just the NRC; it wasn't just the applicant. It also involved personnel from the Commonwealth of Pennsylvania.

DR. JOHNSRUD: May I add here that we have submitted a copy of this initial decision for your records and I

hope that members of the Committee will have an opportunity to look it over.

DR. KEPFORD: Time is limited and your patience is limited and I'd like to read you more sections but I think I better go on because our pile is till large and we should go through it.

I guess I have to go back, on page 69 of the initial decision, is the Board's sweeping dismissal of one issue that was raised and I'd like to backtrack a minute and tell you a little bit about what an NRC proceeding is like. We didn't have the money for legal assistance. Neither of us are lawyers or have a minute's legal training. We went into this, having been involved in the issue from the other side for a number of years and one issue which we had always tried to raise in power plant licensing was that of the health effects of the uranium fuel cycle on people. We were denied the ability to do this by most licensing boards. It was thus amazing, a surprise to us, when in the middle of this proceeding on May 21st, 1977, if my memory serves me correctly, the NRC's staff attorney casually dropped in front of all of the parties testimony which they wished to submit as a result of a licensing case in another nuclear power plant and it had to do with the comparative effects in terms of health of the coal

and uranium fuel cycle. Well, this had been a subject that we had been itching to get our teeth into for a number of years and all of a sudden, with no preparation, the door was kicked open for us. So, we lunged at it. In the entire TMI-2 initial licensing decision, the staff and applicant and Commonwealth put forth a total of about 55 witnesses. Not having money to pay expert witnesses, we were at somewhat of a disadvantage as you would expect, and we were able to put forth one witness. That witness was me. I testified to the effect that the NRC had ignored the largest single source of radioactive emissions in the entire nuclear cycle. In fact, one which is larger than all others combined and as a result, the cost benefit balance for the plant would have to be tipped against the plant and probably the plant could never be licensed because of the health effects which would arise for which there was no known method to prevent. The NRC swept it aside and their dust marks begin on page 69 of the initial decision. They dismissed it completely. It was speculative. It was a challenge to the Commission rules and they needn't consider it and so on. The Appeal Board found otherwise as did the Commission.

Then, on March 2nd, 1978 the commissioners of the Nuclear Regulatory Commission ordered that when the Appeal Board

heard our appeal of the initial decision, they remove from one section of the rules, a rule which said that only a certain quantity of radon could be considered in any licensing case. What my testimony had shown was that they were low by a factor of somewhere between 100 million and a biollion in their estimation of this. On March 8 the Appeal Board concurred with this finding of the commissioners. They held oral arguments and put the issue off. They put the issue off in a number of ways by, one was saying the Commission is certainly going to have to consider this. Another way, they decided to resolve it at some future date but in the process, they linked the survival of Three Mile Island as a licensed nuclear power plant to about 30 other nuclear power plants who were in the process of being licensed before the Licensing Board or Appeal Board and I give you a copy of an Appeal Board decision, ALAB (phonetic) 540 which in itself is not that interesting but it does list and identify the reactors involved. The reason for this is to point out to you that the issue that was raised at Three Mile Island was not a trivial issue. It was an issue of enormous significance and one thing my testimony said was that for each year Three Mile Island Unit-2 operated, on the basis of a certain number of assumptions, approximately one million people would die for each year that nuclear power

plant operates. Now, these people will be scattered off far off into the future, as long as human beings on this earth exist. The problem, as I see it, with any nuclear power plant is, and for that matter coal fired plants, they exert a health tax on people. The health tax is simply by killing people by their operation. The difference, and this is a very critical difference, is that the primary tax exerted by a nuclear power plant is exerted on those people who live in the future. Coal fired plants kills those who are living today. A nuclear power plant kills the unforn and it will kill them in the future for as long as human beings exist.

DR. JOHNSRUD: Could I add here one little point? I think this is an issue of particular significance here in Pennsylvania with respect to the exploration for and the possibility of mining of low grade uranium ores in the eastern part of the state on privately leased, privately owned land leased to energy companies although the state has taken a position in opposition to the use of state land for this purpose. Dr. Kepford is pointing here to a problem of very long term and very large significance that is not immediately apparent.

DR. KEPFORD: Perhaps it would be appropriate to discuss just briefly what this problem is all about. The particular gas that I am talking about is Radon 222. It's

a naturally occurring radioactive decay product of uranium K-238. It comes out of the ground constantly all around us. If we had stone walls in this building, in this room --

CHAIRMAN WRIGHT: They are.

DR. KEPFORD: Radon 222 would be coming out of these walls. It's all around us. It always has been. The problem with uranium mining is the tailings created and the tailings represent sources of radon 222 emissions which would have otherwise not been present had not the uranium been mined and the radon 222 seeps out of the mill tail piles, essentially indefinitely into the future.

Now, NRC has tacitly proposed a number of, as it were, solutions to this problem. They envision, under the current licensing practice, putting five or ten feet of dirt on top of the tailings pile. Most of the tailings piles would be in Colorado, Utah, New Mexico and so on where erosion rates, on the average, can be fairly low but on occasion, like when a heavy rain storm comes along, can very very very high on an instantaneous basis.

The NRC has estimated that in some cases these coverings over the tailings pile might persist for 500 years. The problem with this solution is that the long lived precursor to radon 222, this naturally occurring decay change which is in

the uranium mill tail piles now, has a half life of 80,000 years. So, this 500 year solution that the NRC has proposed is really quite meaningless. It doesn't do any good at all. I call it the pussy cat solution to the problem and if any of you know pussy cats, you know what their solution to a waste problem is. They just scratch a little dirt over it and walk away. When you start trying to find out or conceive of what would be an adequate solution to the mill tailings problem, you quickly see that you are dealing with an enormous quantity of dirt, a couple hundred thousand tons on the average for one year's reactor fuel. You have to some way put it some place where that radon won't get out for periods on the order of 30,000 to a million years and that kind of a solution is difficult with that kind of a volume. Simply scratching a little bit of dirt over it leads you to the kind of silliness, the same kind of silliness that the Licensing Board used in licensing Three Mile Island Unit 2. For instance, like the paragraph I read to you.

The problem is by no means trivial, I repeat. Despite the fact that in this licensing process we showed that the NRC, discussion of aircraft hazard was quite hollow in its decision, the plant was licensed anyway; despite the fact that we showed that the largest source of radioactive emissions in

the entire nuclear fuel cycle had been ignored, the plant was licensed anyway. It really leads me to believe that there is no information that can be presented to any atomic safety and licensing board, appeal board or the commissioners themselves to prevent that plant from being licensed. That's the way things were prior to March 28th, 1979. I don't know whether or not things have changed. I most certainly hope so. I would like to go on and throw a few more pieces of paper at you.

The next one that I have are -- oh, I think we have already discussed to a certain extent these three pieces of paper concerning the scheduling of aircraft crash hearings to be commenced. A response by the attorney for the Commonwealth and the notice cancelling the decision to hold the hearings. I guess I want to digress and say if there is anything to which I have found shameful in this entire scene was the behavior of the Commonwealth. The Commonwealth's purpose throughout this hearing was to do, in my opinion, nothing but rubber stamp whatever the applicant said. In fact, when it came time to file findings of fact and conclusions of law, the Commonwealth did nothing more than adopt those of Metropolitan Edison Company as their own and, essentially, a one sentence filing, in late December, 1977. The interest shown by the Commonwealth in all of these issues which we raised was

negligible, to say the best.

Anyway, advancing on; in April, we filed an emergency petition with the Nuclear Regulatory Commission asking for them to, in my opinion, quit playing around with Three Mile Island and put the cork in it and keep the radioactive materials in it until they could do a revised environmental impact evaluation of what they could do with that plant because, of course, they have never had a plant in that bad a shape before and virtually everything they were doing from then on would be a first-time effort and henceforth, experimental. We filed a supplemental petition on May 15, May 16, asking for a lot of things; if nothing else, than simply to receive information coming out of the NRC on what is going on at Three Mile Island Unit 2 being that we were intervenors and so on, we felt a little bit entitled to this. To date, the NRC has not sent us a shread of information concerning this despite its having been specifically requested.

I'd now like to turn to the ad hoc population dose assessment report and tell you that I think the conclusions reached in it are not supported in the slightest by the data that is in that document and in doing this, I will give you a number of graphs and a report that I have done. Initially, I'd like to show you this one (indicating). This is, in effect,

two graphs of the NRC's monitoring data. There is also one on the other side of this. And the model that was used by the ad hoc population dose assessment group to calculate the answers they come up with. The straight lines shown here are nothing more than the total doses, including background, shown by the NRC TLV thermoluminescent dosimeters from March 31st to April 7th. The curve which goes through a bunch of circled points is the model that was used by the ad hoc population dose assessment group. Beyond, for distances beyond where the data terminated in distance. What I did was put the model inside where we had data and see what the model looked like in comparison with the data and you can tell certainly by looking at this graph which I'm holding up that the model does not in any way, shape or form fit the data. It might be a nice model but in this case, it doesn't work.

This one is on the other side. For certain compass sectors, the model fits better than others but in none of them is there a good fit.

On behalf of the Township of Lower Allowese (phonetic) Creek Township in New Jersey, in a licensing proceeding there, I performed a rather detailed assessment of the population exposures as a result of the Three Mile Island Unit 2 accident and came up with a document which I have attached

there. My conclusion is that the population dose, based on -- again, based on the data that is in the ad hoc population dose assessment group, the population dose was probably on the order of 10 or so times what the population dose assessment group reported. It could be significantly higher than that. They reported the number of 3500 person rem. My estimation is 63,000 and it could be on the order of 300,000, based on a different interpretation of the information they used. In my opinion, the monitoring data which was collected stinks. I can't put it any other way. The background data was gathered very very mechanically without the slightest consideration, in my opinion, with whether or not the background data was good at all. This is the data in the ad hoc group report for the approximately year and a quarter prior to the accident. There is no concern with whether or not the data was any good. There was no concern with whether or not even the placement of the dosimeters themselves were in appropriate positions and I will note in the report itself, it says that one dosimeter which gave very very high background was inside the stone building. I think that it was a water pumping station. Of course, inside a stone building, it would be exposed to gamma radiation from the rock in the building and would, of course, one would expect if one really was interested, high background readings. But the fact that that dosimeter station had high background

readings is not at all suggestive that that area had high background readings. This is just one little problem with the data which was simply reviewed uncritically by the ad hoc population dose assessment group.

When it comes to individual exposures, the highest individual exposure, I went to Met Ed's final safety analysis report. In Chapter 15 of that report, the utility discusses what they call their design base accident. There is a postulated release of radioactive material and postulated doses based on a two-hour exposure at the edge of the site and that's for more or less an instantaneous puff release. That calculation is not terribly applicable to this accident but then it's not that unapplicable either because a lot of people hung around even though doses were protracted. The other dose is a 30-day resident at the edge of the low population zone which is about two miles. Based upon a simple extrapolation from those calculations in the final safety analysis report of Met Ed, my estimation was that the maximum exposed individual; that is, somebody on the edge of the exclusion zone, would have gotten a dose of somewhere between one and 300 rem, not millirem; rem.

For the 30-day exposure at the edge of the low population zone, it runs between 20 or 30 and 40 rem, not millirem. Again, these are much much higher values than any-

body has been talking about. I'm not totally convinced they are right but I think it's high time somebody other than an individual whose entire career has been dedicated to the existence and the proliferation of nuclear power plants looks over this data and comes up with some independent conclusions. I'm very disturbed by this kind of thing and I'm also very very disturbed by some of the statements which have come out by what we have been led to believe are responsible individuals.

The NRC, in an April 12 memo, calculated 13 million curies of zenon 133 were released in that accident. However, the number, conveniently for Met Ed, has been revised downward to half that by more sophisticated lowering techniques, I submit.

Considering the course of that accident, it's not hard to visualize that a significant portion of the radioactive materials that were in that core when the accident took place were vented to the atmosphere. I wouldn't be a bit surprised if somewhere between ten percent and a third to a half were released. For zenon 133, that would certainly include the 13 million curies.

In response to -- in the same licensing proceeding, the same proceeding in which I submitted my report, the NRC made, from the pen of Roger Matson, a rather astounding state-

ment. They concluded -- therefore, we conclude that the accident of Three Mile Island was a Class Nine event. However, at no time during the TMI-2 accident were the radiological consequences to the public more severe than those calculated for the design basis of the plan. Now, I repeat, if you go to the final safety analysis report, you'll find that the maximum release of radioactive gases in any accident is 88,000 curies. For TMI-2 they esitmate 13 million. Now, you know which is larger, don't you? Thirteen million is clearly larger than 88,000. Yet they are saying the consequences were less severe than those calculated for the design basis.

There are lots of strange things going on here which quite frankly, I don't understand but considering the accounts I have seen, the credibility of the NRC and Met Ed and so on certainly ought to be about zero and one thing that really puzzles me is that we are starting licensing hearings to open TMI-1 and probably TMI-2 in the future and we will probably have the same dreary crew as witnesses coming forth giving us abother set of the same dreary reassurances that we had in the licensing of TMI-1 and 2 in the past and I can't, for the life of me, see how things are going to be the slightest bit different than they were before. The decision will be the same. After all, the NRC has a perfect record in granting con-

struction permits and licenses. Those which have been asked for have been granted period; no exceptions.

In closing, I'd like to give to you copies of talks given by two of the commissioners of the NRC, Peter Bradford and John Hern (phonetic). They will make very very interesting reading. I call to your particular attention page three of Commissioner Bradford's comments where he discusses the 12 symptoms or aspects of a regulatory agency that regulates more by reassurance and self-delusion than on regulation. I think you'll find them quite interesting and unfortunately sadly applicable to the TMI-2 situation and I'd like to add one last comment here. We're involved in the licensing process for Susquehanna Unit 1 and 2 at Berwick and the staff in that proceeding is acting in a way which I can only describe as incredibly disturbing and very very ugly. They are attacking us and trying to drive us out of that proceeding by simply weighing us down with paper work and if we can't respond to the paper work, demanding that we be expelled from the proceeding. They are refusing to supply background information to do nothing more than back up the assumptions they used in justifying the conclusions they reached. And it's very very disturbing and I think this entire subject is very well worth your while to look into. Thank you.

DR. JOHNSRUD: I would like to go back to one point very briefly. When Dr. Rapp testified earlier today, there was a bit of discussion of symptoms that -- of radiation sickness that people in the Central Pennsylvania-Susquehanna Valley felt during the course of the accident. This is a matter which has come before us as a public interest group with a long history of involvement with TMI; in telephone conversations; reports from numerous people, medical doctors as well as ordinary citizens, of a range of symptoms that we ordinarily do associate with radiation exposure at high levels and I thought it might be worthwhile, in that regard, particularly in view of the startling higher dose assessment that Dr. Kepford has found upon a re-analysis of the NRC and Met Ed data to suggest a possible explanation or, at least, raise the question of explanation that have been troubling me. If, indeed, many people in this area, among them Harold Denton, according to Joseph Buchard (phonetic) of the NRC Public Relations Staff, experienced sore throats during the five to ten days of the worse portion of the crises. If, indeed, people in this area experienced nausea and diarrhea and skin rashes and burning eyes and what has been described to me by reporters as well as many residents of a metallic odor or taste, odd clusters of symptoms, let's say, I'm curious to know what the explanation is since the

symptoms are those that we would expect at much much higher levels of radiation than the NRC has indicated and I can see possibly three or four ways of looking at them. First, that there is no relationship whatsoever. It's merely happenstance. Secondly, that perhaps enough people did know what those symptoms would be to feel that they felt them and I might give credibility to them if I had not been among those who was present during a portion of the accident and suffered some of them myself. I don't know. Perhaps that is an explanation, at least for part. But the other two, three, explanations would be that there may have been some synergistic effect from the releases from the plant and something else in the environment; and fourth, and this gets to the last two important ones. Possibly Dr. Kepford's assessment comes closer to the truth of the matter in view of the fact that the NRC has had testimoney before the Commission itself that the stack monitors were off scale during the first days of the accident and in view also of the fact that the EPA representative, Mr. Brethauer, testified before the Congressional Committee on Science and Technology back in June to the effect that the termoluminescent docimeters that were in place did not pick up the bulk of the beta doses. So, perhaps there were high enough level experienced by a portion of the population to accomplish more of the

symptoms that we think of at 25 rads, 50 rads or more exposure and that, of course, is extremely troubling in terms of the long term health effects that would then have to be expected.

Finally, however, I would raise another aspect and that is that we consider the range of sensitivity that individuals have towards various pllutants such that perhaps if indeed the low dose assessment is correct, that nonetheless a significant sector of the population has a sufficiently greater sensitivity than average to have been able to detect a set of physical responses. In general, however, I would point out that the declaration of an extraordinary nuclear occurrence upon which the NRC is currently deciding indicates that there must be the clinically observable effects and given our past understanding of the level of exposure at which individuals would experience these effects, I would submit that there is a possibility that the medical people in this area were, in fact, somewhat misled in diagnosis. Do I make myself clear?

DR. KEPFORD: I'd like to add a little bit to that. Very shortly after the accident, this kind of information started coming out concerning the maximum exposure of 83 millirem and low population dose and so on. In the Commission's requirements for a finding of an extraordinary nuclear occurrence, they talk about objective clinical evi-

dence. Now, the NRC, to my mind, has already clearly muddied the water and made it impossible for there to be objective clinical evidence by the fact that in the early days after the accident, they announced that the population exposures were low. They have eliminated the possibility in my opinion that this finding can be had and in the process, well, along with it, having given out this information, they made it very easy for the medical profession to say look, the doses are small. You can't have effects at that kind of doses and I think this is a very serious problem.

If there is any last idea I'd like to leave with you it would be that if there is anything we should have learned from this accident, it should be another, a new understanding for the word fragile. The regulatory process is very very fragile. The licensing process is fragile. The response capability in the event of an accident is fragile. Nuclear power plant itself is very very fragile and things can go wrong, I think in the case of TMI-2, much much faster than the human beings and the safety equipment involved are capable of keeping up with. The system is fragile but most of all, the human beings themselves, and those are the ones we are concerned about, they are more fragile yet. Thank you.

ACTING CHAIRMAN REED: Thank you very much.

Representative O'Brien?

BY REPRESENTATIVE O'BRIEN:

Q First of all, on those records you handed in, you made the statement that you may not be able to get them. Isn't it true that over 90, 95 percent of them are in the library and they are public records?

BY MR. KEPFORD:

A The records we asked for from the NRC were more or less documents which they have published and so on and the NRC, in the past, had made -- gone out of their way to make available documents to us, including, I might add, a lot of background material on the TMI-2 event --

Q Aren't these records available in the public library?

A Not to the best of my knowledge, in Harrisburg.

Q Did you go over to the public library to check and see? My staff tells me they are available.

A Well, that doesn't terribly help us because we are in State College and --

Q The only thing is they are public records and as far as I can see, they are available and they are at the library?

A First off, most of the materials we requested did

not pertain necessarily to TMI-2. The staff's response was that these are document publicly available in the Public Document Room in Washington, D.C. and if that wasn't convenient for us, they would make them available at staff headquarters in Bethesda, Maryland which is four and a half hours away. We were after a few dozen documents for their background information and when you consider the time involved and the fact that we don't get compensated for any of this, it's simply totally out of the question to demand that we go down there and spend a month or six months reading materials in Washington, D,C. It's simply outrageous.

Q Our staff goes to the library and we pick all of the hearings and everything else up at the public library and I want the record to show that in my opinion they are available.

DR. JOHNSRUD: Mr. O'Brien, I think that there are two sets of documents we have referred to here. Perhaps I can clarify. Dr. Kepford is referring just now to the documents that have been requested from the NRC staff that would not be available in a local documents room ordinarily. They would be available in the NRC's public documents room in Washington in background reports dealing with issues other than Three Mile Island. However, the lack of availability that he spoke of at the beginning with respect to the documents we

have submitted for your records is not technically that they are all unavailable at the library. We are submitting these documents to you as a kind of way of bypassing many many hours of trying to search them out from the millions of pages now that must be on the record.

REPRESENTATIVE O'BRIEN: We appreciate that but I just want the record to show that we had no problem getting anything that we want.

DR. JOHNSRUD: I would add too that in searching the record of the Susquehanna case in the local documents room, I found that the record was sorely deficient; that the library either had not received from the NRC or had not yet catalogued and placed on the shelves the documents that were necessary.

REPRESENTATIVE O'BRIEN: I don't disagree with you that NRC has a long way to go. But my position is that you can't kill an industry just because on branch of government needs to be corrected. I have stated time and time again that NRC should be probably abolished and a new regulatory agency set up that will do the job and do it the right way but I would like to go a little bit further. When you said in your statement that certain plants should remain and certain plants should not be allowed to reopen. Would you rephrase

that?

DR. JOHNSRUD: I was suggesting that the Pennsylvania Legislature act in order that no additional plants come on line. Secondly --

REPRESENTATIVE O'BRIEN: Let's clear that up now because I have a bill that says no new plants will come on line; no new licenses will be granted until the waste material and other problems are corrected. Would you buy that bill?

DR. JOHNSRUD: I would want to read it in its entirety.

REPRESENTATIVE O'BRIEN: Did you read that bill?

DR. JOHNSRUD: I'm not certain of the version.

REPRESENTATIVE O'BRIEN: How come you have all of the records and everything else and there is a good bill and you haven't read it?

DR. JOHNSRUD: I would be delighted to read it, Mr. O'Brien.

REPRESENTATIVE O'BRIEN: I have a lot of respect for you. I think before Three Mile Island, of all the people I talked to, you had one of the most open minds on nuclear and you felt like I did. I believe you did -- if it was safe, that you could buy it. But since Three Mile Island, I just want to explain one area. I went up to Bloomsburg one night,

invited up. You people had a meeting up there and there was an audience of about 100 people at the meeting. One of the statements, speaking about speaking the truth, and I was one of them up there and I was shocked at one of the statements you made. You said that you have to drive down to Harrisburg and you probably will glow after you come out of there.

DR. JOHNSRUD: I don't recall making such a statement.

REPRESENTATIVE O'BRIEN: You made it and I remarked at the time that you might be kidding around but there is 100 people there and you heard the doctor from Hershey state this time and time again, taking a test and it showed no radiation in and around Hershey, eight miles away; and there were tests around Harrisburg and there was no radiation because I had to go back to Harrisburg and I was down here, you know, and I would be concerned myself.

DR. JOHNSRUD: Mr. O'Brien, I would like to respond to that, if I may, because I'm troubled that you would say such things. I don't remember making any such statement. If so, I'm sure they were said facetiously.

REPRESENTATIVE O'BRIEN: Ted Stuban took it the same way.

REPRESENTATIVE STUBAN: I don't want to leave you

hanging, Bernie, but the statement was made at the Berwick High School. It wasn't Bloomsburg. And, I think, Doctor, that evening, you know, it concerned me a little bit and, I guess, it concerned Bernie because Bernie left Harrisburg and I was going to stay home that evening but the statement was made that you were at the evacuation center at Hershey and it shocked me today to hear the doctor say what was going on there because you were so concerned, even to leave the evacuation headquarters, open up your Volkswagen and to get in and you were so relieved when you got away from the contamination area heading toward your home.

DR. JOHNSRUD: Mr. Stuban, let me explain that situation because I think this points up something that perhaps many members of the public only now are beginning to understand about radiation. I was not at the evacuation center. I was at WITF seeking some information that morning on my way to Philadelphia. That was the Friday morning. While I was at the television studios, I spoke with a wife of a person in the Transportation Department who had phoned his wife to say that an evacuation was getting under way.

Secondly, while I was at that channel, the news director took from the wire service just received the notification that there had been an uncontrolled release of radioactive

materials, gases, from the plant that morning. Now, knowing what I knew about the impact of a breach of containment, about the deterioration in the condition of the reactor over the previous 48 hours or more, and knowing that I had a long distance to return to be out of the Harrisburg area to my home, when I left -- oh, I should add also that as I came into Hershey, the emergency alarm opposite the public building of Hershey went off. Now, when a set of circumstances of that kind, following the previous night dump of low level radioactive water in the Susquehanna River indicated to me that they were preparing for other possible highly radioactive waters contained in those tanks. When all of these factors were put together, I was as many people in the Harrisburg area were, suddenly faced with the realization that a core melt might indeed be in progress; that a breach of containment might indeed have taken place; and that this was not a place to stay.

Now, I want to point out something else to you that perhaps those who had not been cognizant of the problem of radiation contamination from a large reactor accident previous to this event would not have understood and that is that I was facing a long drive back to my home in which time period I had no access to a radio, to information. I had the possibility that indeed I was contaminated because the time had passed

since the announced release and my departure from Hershey, given the wind direction and the wind speed, would have put the radioactive plume in that area. I had a justifiable concern about the level of contamination that I or anyone else in the area might have experienced by then and I was faced with the question of going home; not wanting to enter my home to track in contamination if, indeed this was taking place; wondering to myself where does one go to find out, to have a detection done. Now, this is the reality of a core meltdown breach of containment accident that --

REPRESENTATIVE O'BRIEN: I don't want to interrupt you but you are doing a great job in getting around the question I asked you, you know.

DR. JOHNSRUD: Let's go back to it.

REPRESENTATIVE O'BRIEN: You are a real expert at it. There was no radiation in Harrisburg.

DR. JOHNSRUD: We can't know that.

REPRESENTATIVE O'BRIEN: Don't you have any faith in your officials at all?

DR. JOHNSRUD: I have faith in what the NRC staff testified.

REPRESENTATIVE O'BRIEN: We sit here and --

DR. KEPFORD: Northwest. This is the NRC's data.

The radiation levels went up as you got further from the plant and peaked in the neighborhood of Harrisburg. The NRC's data shows it.

REPRESENTATIVE O'BRIEN: We were in Harrisburg and we were told by both NRC and DER that the radiation was down. You heard the report from the doctor from Hershey that gave the same information and the only part I'm telling you, and I'm telling you publicly, I was disappointed in the statement you made to 100 people. You have them concerned about something that was not the truth.

DR. JOHNSRUD: Mr. O'Brien, Albert Gibson of the NRC staff testified on June 21st before the Commission that the staff monitors were off scale. There is remaining a very large question about the amount of radioactive material that was released, the amount of radicactive gases that were released.

REPRESENTATIVE O'BRIEN: Was the machine at Hershey off too, and you heard the doctor today testify here? I asked him because I had an idea you would be on.

DR. JOHNSRUD: This is where we have inadequacy of the data that were in place at the time to register. Dr. Kepford would like to add some comments.

DR. KEPFORD: If one does nothing more than look

in the data in the ad hoc group report, you can see that in the direction towards Hershey, which is east to northeast, as I recall the plant, the doses for that week were pretty low. This, again, this is the NRC data, March 31st through April 7th. On the other hand, toward Harrisburg, they go up with distance. That's what this peak is. This is the NRC data simply added up for the eight days and plotted on a piece of paper; no more done to them. It goes up with distance and that's where Harrisburg is.

REPRESENTATIVE O'BRIEN: All I am told is, and I have faith in public officials and whoever gave the information, that the people in Harrisburg were constantly being told what was going on; were told we did not have to worry and I don't believe that you people should go out and make statements if you don't have the facts.

DR. KEPFORD: Do you want to ask them to explain this?

REPRESENTATIVE O'BRIEN: And you didn't have the facts that night. That's all I have.

REPRESENTATIVE ITKIN: What do you have on this? What's the peak load here?

REPRESENTATIVE O'BRIEN: The night of the meeting I'm talking about because I went back that night and I went

back to an area, Doctor, where you said you were afraid to go.

DR. JOHNSRUD: Mr. O'Brien, --

REPRESENTATIVE ITKIN: Does this show total growth?

DR. KEPFORD: Yes.

REPRESENTATIVE ITKIN: The peak you are showing is less than 8MR total?

DR. KEPFORD: That's correct.

REPRESENTATIVE ITKIN: That's over a period of eight days?

DR. KEPFORD: That's correct.

REPRESENTATIVE ITKIN: Right?

DR. KEPFORD: That's correct.

REPRESENTATIVE ITKIN: You are telling me that this is the piece of information that you're pointing out as being critical?

DR. KEPFORD: No. There is much more to it than that. Remember, there are no monitors out for the first three days of the accident when probably 50 to 95 percent of the radioactive materials had been released. This is the tail end of the release. All right. What I would suggest --

REPRESENTATIVE ITKIN: Just let me interrupt. We have DER up in the Fulton Building. They had monitors up there.

What did their data show?

DR. KEPFORD: I have not seen it.

REPRESENTATIVE ITKIN: Why don't you go over and find out?

DR. KEPFORD: Fine, in my spare time I'll do that.

REPRESENTATIVE ITKIN: When I was up there during the crisis, their readings were background, some slightly above background; never an indication from the Bureau of Radiological Protection any problem in the Harrisburg area, from their monitors located right in the Fulton Building.

DR. KEPFORD: What do you consider or what do they consider no problem?

REPRESENTATIVE ITKIN: Well, I mean it was around background.

DR. KEPFORD: It should have been higher because the NRC's own data shows it was.

REPRESENTATIVE ITKIN: It shows you. I don't know where this data came from.

DR. KEPFORD: This is directly from the ad hoc population dose assessment group.

REPRESENTATIVE ITKIN: Like I said, I don't know the specific location of the monitors. I don't know -- even if it were, even if it were at this level; is that critical?

DR. KEPFORD: At this level, I don't think it's critical. What I am saying is that probably the doses for those first three days were much much higher than these and if this --

REPRESENTATIVE ITKIN: But you don't know and neither do we. So, you are speculating on an unknown.

DR. KEPFORD: I'm not speculating because whether data is available and for the first three days, those conditions were pretty awful as far as exposure to human beings go.

REPRESENTATIVE ITKIN: All I know is I did not run home. I was here through Wednesday. I was here through Thursday. In fact, I was in this very room. I was here through Friday. I was here through Saturday. I went home Saturday afternoon and the Governor summoned me back Sunday. I was here Sunday, Monday, throughout the entire period and I don't glow. I don't think so. My wife worked at Middletown in that area. She was pregnant. Six weeks ago we had a baby boy. He doesn't glow.

ACTING CHAIRMAN REED: Representative Foster?

REPRESENTATIVE FOSTER: Dr. Kepford, the hour grows late. I'll try to keep my questions to a minimum. Do you have any idea or any speculation as to any additional

deaths through leukemia or cancer say in the 25, 50 mile radius of Three Mile Island, any additional deaths?

DR. KEPFORD: Are you asking me do I know of any or do I feel that some will occur?

REPRESENTATIVE FOSTER: No. Do you have any statistics on that?

DR. KEPFORD: Which?

REPRESENTATIVE FOSTER: As to the deaths that might occur within a, say, a ten year, twenty year period?

DR. KEPFORD: If my estimation of the population dose is correct or if my estimation of the maximum individual doses is anywhere near correct, then I would suspect there will be hundreds to thousands of people dying as a result of the accident at TMI-2 and I would like to add, while we're on that subject that in my opinion, because of just this, the studies which have been designed to study the problem will fail because they are comparing the doses receive by people inside a five-mile radius with those out. In the Harrisburg area, the doses outside the five-mile radius are higher than those inside the five-mile radius. The study is designed to fail.

REPRESENTATIVE FOSTER: How do you regard the NRC report that they would anticipate one to ten additional deaths from cancer?

DR. KEPFORD: That's the report I have been talking about, the population dose assessment group. From the time I have spent glaring at this report which was literally tens of hours, I don't think it's worth the paper it's written on. I think it's a very sophmoric attempt to hide what went on.

REPRESENTATIVE FOSTER: On what data would you base hundreds to thousands of deaths?

DR. KEPFORD: It's discussed in --

REPRESENTATIVE FOSTER: Speculation?

DR. KEPFORD: No. The population exposures which I referred in my report to the Salem Licensing Board on the question whether or not TMI-2 was a Class Nine accident from the radiological point of view. It's a reassessment, using the data from this report, but using a different methodology.

REPRESENTATIVE FOSTER: Because we listen to figures like you are speculating on there, you would think you were talking about Hiroshima.

DR. KEPFORD: No.

REPRESENTATIVE FOSTER: No.

DR. KEPFORD: Quite a bit different. Hiroshim, there was a sudden blast. Most of the radiation exposure from that experiment on human beings was over with in a matter of seconds. From the TMI-2 accident which is still going on, it

went on for over a pe iod of days and we have the possibility that the worse might yet come. This is just what Mr. Gerusky was talking about this morning. There is an ever present need to evacuate. Now, in an operating nuclear power plant, you have what they call all of these lines of defense: the fuel cladding, the pressure boundary and ultimately the containment building, the containment structure or vessel. TMI-2, all three of these were breached. When the day comes that they must open up that containment structure to get into that pressure vessel, all three will again be breached and the possibility will exist for large quantities of -- for instance, strontium 90, to get out. If that does, all of a sudden, no matter how serious that accident was in the past, it becomes much much more serious because strontium 90 means land contamination and that means contamination of the food and contamination of people's bodies and they will stay contaminated for long long periods of time and this is the kind of contamination which you do not get in a strictly gaseous release.

REPRESENTATIVE FOSTER: From listening to your testimony, you have indicated that you favor the actual closing of all nuclear plants.

DR. KEPFORD: As soon as possible.

REPRESENTATIVE FOSTER: What do we do then for the

power that is lost?

DR. KEPFORD: Use what is sitting as idle capacity all over the country, especially in this general area or region of the country. There is a fairly large excess generating capacity, even before TMI-2 came on line.

REPRESENTATIVE FOSTER: Could we go --

DR. KEPFORD: I think it was a 55 percent excess generating capacity.

REPRESENTATIVE FOSTER: Could we use coal fired?

DR. KEPFORD: Absolutely. Coal can be burned cleanly. It might raise the price of electricity but what we're talking about is like I said earlier. It's a health tax. We can either tax this generation for our power and pollution or we can tax, to an extent which we cannot control really all future generations. Now, which is the honest one to do and which is the prudent one to do?

REPRESENTATIVE FOSTER: In your 20 year speculation in regards to death, would you have any estimate of how many miners would be killed?

DR. KEPFORD: How many?

REPRESENTATIVE FOSTER: How many miners, coal miners?

DR. KEPFORD: I have no idea. But, again --

REPRESENTATIVE FOSTER: The thing --

DR. KEPFORD: Again, in many European countries coal miners live as long as anybody else in the population in general. We don't have to mine coal in the most slipshod manner possible. It can be done safely if the intent is there.

REPRESENTATIVE FOSTER: I can only say, in response to that, that you're speaking of the possibility and I have to regard it as a remote one, of hundreds or thousands of deaths in the next ten to twenty years. But I'd be much more willing to bet on the deaths of coal miners. I'd place a bet on that, in the next ten to twenty years.

DR. KEPFORD: Again, we're talking about two different things. We are either talking about a health tax on the generation which gets the benefit of electric power or a tax which is deferred and enlarged upon for all future generations.

REPRESENTATIVE FOSTER: I could put it another way. We are talking about possibilities.

DR. KEPFORD: They are certainties.

REPRESENTATIVE FOSTER: Speculations.

DR. KEPFORD: They are not speculations. They are certainties.

REPRESENTATIVE FOSTER: I guarantee the deaths of the miners are certainties.

DR. KEPFORD: But they can be prevented. There is no assurance whatsoever that fuel cycle deaths can be prevented and they are far higher than what have been estimated burning a coal fired plant. But, again, we enjoy the electricity. We should be prepared to pay the benefit. When we rely on nuclear power, we simply defer that cost and enlarge it for all future generations that follow us and there is a difference. Among other things, it's a very deep moral difference and we are running across these problems when we find uranium wastes buried in Canonsburg, Pennsylvania which were left there 40 years ago; when we run across chemical waste dumps like the Love (phonetic) Canal near Niagra Falls. This is deferring of the paying of the health costs to some future generation. Now, the Love Canal costs are coming due now with health problems up there. But the uranium fuel cycle cost will go on indefinitely and we have no assurance that they can be prevented.

DR. JOHNSRUD: I'd like to add a point or two, if I may. Our society has been accustomed to think in terms of endless expansion of resource utilization. As a geographer, I have fairly carefully looked at resource assessments; at what has popularly been called the limits to growth and I find when I reflect on the uses of energy and resources in our

society, that we have in a very favored period of world history in this society learned to use resources most unwisely. Many of the things we do are not essential either to our survival or even a good standard of living, in terms of the way we use energy at the present time. The thrust of those who would find the health consequences of the nuclear industry unacceptable and the genetic consequences over the long period of time are unacceptable.

REPRESENTATIVE FOSTER: What are the genetic consequences?

DR. JOHNSRUD: It's very difficult to estimate precisely. I think perhaps there is a fundamental misunderstanding or misperception on the part of many in the public concerning what is or is not damaging amounts of radiation. All geneticists that I know of that are responsible in this area would say that any exposure to ionizing radiation, including natural background, may have a genetic impact, a negative genetic impact. Of course, we don't know precisely upon whom, what cell, when it will show up in terms of the damage. But for any, as many people put it, for any one genetic benefit to our species from exposure to radiation, there will be many negative, detrimental effects. Now, I personally translate those negative effects; that is, the genetic damage, into the

damage to human beings. It's extremely difficult to give any precise response to that question but the standards we do have, the standards that we do have at the present time are based on the assumpton on the part of the standard setters that there is a societal good to be derived from the electricity produced that is a compensation for the genetic or somatic cost that they do not deny will occur. In addition, there is a whole realm of uncertainties that relate to the long term genetic effect that, are not gross mutations, but are what the geneticists term mild mutations or gentle mutations; that is, those which impair the functioning or the capacities of a human being but are not sufficiently detrimental to keep that human being from reproducing; that is, gross genetic defects. They are not the kind that would cause people to die at a very young age or stillbirths or anything of that nature. But nonetheless there are genetic defects that are passed into the gene pool and hence into distant future generations. It's extremely difficult for us to make precise assessments. I personally go back here to a dictum that I think is accepted among public health officials. When in doubt, don't. When there are uncertainties concerning the impact of, in this case, a technology, upon a large population, a total and future population, do not take the risk at the present time. Utilize

instead those forms of energy that would minimize the risk. Does that clarify the position that we are taking? I think it's a responsible position.

REPRESENTATIVE FOSTER: That even confuses my clarification. I asked a short question. I'm afraid to ask a long one now.

DR. JOHNSRUD: Maybe you'd get a short answer to that.

REPRESENTATIVE FOSTER: I asked what the genetic consequences were. The genetic consequences of Nagasaki and Hiroshima are not apparent at this point, after 30 years.

DR. JOHNSRUD: That is a good qualification, are not apparent at this point. And that's a good qualification in part because it may well be that those that would have exhibited the genetic defects in the first generation were the ones that simply didn't get born.

REPRESENTATIVE FOSTER: We are getting into the second generation at this point.

DR. JOHNSRUD: It's the kind of thing that requires a major population study, a major genetic study, over a long period of time. It's too soon to tell, particularly the recessive effects.

REPRESENTATIVE FOSTER: Well, basically I'm going to

wind down my questions at this point but from your testimony, Dr. Kepford, you do not favor nuclear power; you do not favor coal fired plants to any great extent. I just wonder where I'll get my electricity next year.

DR. KEPFORD: How much more electricity will you need this year than you -- next year than you needed this year as opposed to used or wanted?

REPRESENTATIVE FOSTER: I'm not home enough to use much.

DR. KEPFORD: Then, you won't need any more, will you?

REPRESENTATIVE FOSTER: I doubt it. I hope not.

DR. KEPFORD: But, you see, the justification for all of these different power plants is that year after year people are going to be using and needing and wanting more electricity and if we all don't use any more, then we won't have the need for any of these nuclear power plants.

REPRESENTATIVE ITKIN: Dr. Kepford, you talk about saving resources. Here you are mentioning energy resources.

DR. KEPFORD: That's correct.

REPRESENTATIVE ITKIN: In Pittsburgh, the Jones and Laughlin Steel Company is going ahead and is in the process of constructing and will ultimately have a, if it doesn't

alreadf have it, an electric arc furnace operating for resource recovery of steel which requires a tremendous amount of electrical energy for the electric arcs to melt the steel and by doing so, assist in the utilization of scrap metals for the manufacture of new steel. So, in that regard, the use of energy may not be used unwisely but may be used as an opportunity to minimize the squandering of other natural resources that we presently have.

DR. KEFFORD: Yes, and I think you picked a good example. I'd like to come back and say that the potential for conservation in our society has not even been scratched.

REPRESENTATIVE ITKIN: Energy conservation. I was saying you asked Representative Foster that he didn't need any more energy. There are certain processes that will assist in natural resource conservation, other natural resource conservation, which will require a substantial amount of energy to accomplish this.

DR. KEFFORD: I'm not arguing with that. I'll accept that. I don't have any problem with that. But does that -- I don't see how in any way, shape or form that requires the entire nation to use more and more electricity each year. Again, the energy conservation potential has not yet been scratched in this country. For one, the data I was given re-

cently from the DuPont Corporation, since 1972 or '73, they have upped the production of their chemicals something on the order of 40 to 50 percent. In the process, energy consumption went up four percent. That's energy conservation. Now, there will be a trade-off and probably the energy consumed by recycling scrap metal certainly, certainly in the case of aluminum, is far far greater than that consumed -- is far less than that consumed in mining the virgin ore and its benefaction.

REPRESENTATIVE ITKIN: Different type of energy.

DR. KEFFORD: It's electrical. It's strictly electrical. It's much easier to recycle aluminum in terms of energy than it is to get it from the ore. The same, I might add, applies to virgin iron ore and the recycling. It's energy conservative to recycle. This is the direction which, in my opinion, we're going to have to go. It's absolutely necessary that we go there. Otherwise, one of these days, when we start running out of resources, we are going to have economic consequences nationally and world wide which are going to be pretty mind boggling, in my opinion.

CHAIRMAN WRIGHT: Thank you very much for being with us. We thank you for your testimony. At this point, we will adjourn the meeting until ten o'clock tomorrow morning.

(The hearing terminated at 2:58 p.m.)

I hereby certify that the proceedings and evidence taken by me before the House Select Committee - Three Mile Island, are fully and accurately indicated in my notes and that this is a true and correct transcript of same.

Nancy U. Adelman, RPR/na